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"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted; and it will die away, if they shall entirely cease."—Sir Wm. Jones.

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JOURNAL

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ASIATIC SOCIETY.

No. I.—1855.

Notes on Assam Temple Ruins, by Capt. E. Taite Dalton, *Principal Assistant of the Commissioner of Assam.*

The claim of Assam to a high position amongst the classic lands of the east, which has so long lain dormant, would, in all probability, have been earlier investigated, had not an idea generally prevailed that no works of antiquity were to be found in the valley to sustain it; that it was a country without such relics of past ages as are found in other parts of India, and therefore, without a history that was worth enquiring into.

But it is not thus barren; for from the Sub-Himalayas, which form its northern barrier, to the ranges of mountains separating it from Sylhet and from Bengal, and as far east, up the valley, as our knowledge extends, evidences are found of a once teeming population and a highly advanced state of art.

The trackless forests, in which most of these remains of human power and skill are found, and the present condition of Assam, with its scanty indolent population and vast wildernesses of waste, are melancholy indications that they are the works of an age and race long since passed away, and curiosity cannot fail to be excited as to who the people were that constructed them, and where they lived.

Having been authorized by Mr. Robinson to submit to the Society his views on the ancient history of Assam, I thought the subject might be made more interesting, if illustrated by some account of

the antiquities supposed to appertain to the period of which he treats, and this has induced me to string together and submit, with a few sketches my own, notes on the ruins I have visited.

Mr. Robinson has assumed that Gowhatty was the ancient, as it is the modern capital of the valley. Its former importance is indeed well attested by the immense extent of its fortifications, the profusion of carved stones which every excavation in the modern town brings to light, the remains of stone gateways, and the old stone bridges that are found within and without the city walls.

These walls, partly of masonry, embrace a tract several square miles in extent, including hills and plains, through the midst of which, confined to its main stream by natural bastions of rock, and broken and diversified by rocky islands, flows, in a basin from three-fourths of a mile to a mile in breadth, the noble Brahmaputra.

Budh could not have selected a more lovely spot for the dissemination of his doctrines or the close of his career.

The zeal and devotion of the age decorated every prominent point, in this beautiful scene, with a shrine or Choityo, in honor of the divinity or saint that hallowed it. Stone temples appeared blending with every rock; each island was adorned with a shrine; the peaks of the hills were similarly crowned; and for the pilgrim who sought retirement less obtrusive altars were raised in the recesses of valleys or groves.

But peace did not always reign in this holy vale, and the labour bestowed on the entrenchments, tells of many a hard fought struggle with an invading force.

In the fortifications of the old city care was taken to use and improve the natural defences afforded by the ranges of hills, which surround or are enclosed in them. In some precipitous places, a causeway with a breastwork, for the protection of the besieged, and semi-circular projections, as watch-towers and flanking defences, were all that were considered necessary; but, where the natural obstacle was wanting, a lavish expenditure of labour has raised embankments from hill to hill, from 25 to 40 feet in height, and not less than 30 feet in breadth on top, with a moat 100 feet wide.

The entrances to the city were by gateways of stone, some of which were subsequently replaced by archways of brick. On a

causeway, leading to the principal northern gate, is the remarkable stone bridge 146 feet in length with 22 waterways, described and illustrated in the Journal No. IV. of 1851.

Nothing approaching to the principle of an arch enters into the composition of this very extraordinary piece of architecture, the object was, evidently, to construct, in stone, a bridge on the same plan, as those the artificers had been accustomed to frame in wood. It is stone carpentery; we have posts, beams and planks, represented by columns, architraves and slabs.

Within the fortifications there is a smaller bridge, constructed on similar principles, now dismantled, and some arched stone-bridges, in good preservation, and still used, belonging doubtless to a more recent epoch. Of the religious edifices constructed within the walls, nothing but fragments remain. The Hindus have appropriated many of the most picturesque sites, and built brick temples, surrounded by the carefully dispersed stones, fragments of the old Choityos.

In some instances they have clumsily used the old materials, and in others, the ancient buildings have been dismantled to a certain extent only, and a superstructure placed on the old basement.

Some of these modern temples or clusters of temples are of considerable celebrity as holy places.

Within the old walls of Gowhatty is the temple of Kámikhyá, which is known wherever the Hindu religion prevails, and is resorted to by pilgrims from all parts of India. It is built on a hill, known as the Nil-á-chal, which rises from the banks of the Brahmaputra to 750 feet in perpendicular height, and has, doubtless, from its lofty, commanding and romantic position, always held a high place amongst the holy places of the land; but, from the different renovations it has undergone, it is of little use in exemplifying the ancient architecture of the valley.

The ancient temple must have been dismantled to within a few feet of the foundation, and covered as it is, by coatings of stucco and white-wash, we can scarce discern the beauty and elaboration of the tracery, except from fragments of detached friezes and cornices lying about.

The most singular relic is a huge finial, a stone vase measuring

(at a guess) 12 feet in circumference, which was originally the crowning ornament of the dome, but which all the power and skill of the renovators could not replace in its former position. It now lies on the ground, outside the enclosure, and a good sized tree has taken root in the bowl!

It will be seen from the note that the origin of this temple is ascribed to King Norok,* or, at all events, that it was in existence in his days. In re-excavating a large tank, in the modern town of Gowahatty, which is named after that monarch, the fragments of more than one stone temple were found, and in every part of the station, carved stones are constantly being exhumed from deep below the surface.

The present Jail Hospital occupies what appears to have been the site of a stone temple of more than the ordinary dimensions, judging from the shaft and capital of a column, an altar block and other fragments, that were dug up there, much larger than the corresponding pieces of the temple ruins elsewhere. They were found, in levelling the compound, some depth below the surface, and further excavations would, in all probability, bring the whole of the fragments of this interesting temple to light. One of the most prominent objects in the view from Gowahatty is the Oománand, the "Isola bella" of the scene; the delight of Ooma and celebrated throughout India as a holy island.

It was here that Siva is said to have communicated to Párbati the prophetic history contained in the Jogini-tantro, and all evil omens are averted by one glance at the spot so honored.

It rises about 60 feet above the stream. Groves of trees, of varied foliage, drooping over the rocks, add to its height, and above them tower the minarets of brick temples dedicated to Siva and Párbati.

* The Jogini Tantro, a work of high repute in Assam, as its contents are supposed to have been communicated by Siva to his consort Párbatí, states, regarding the king Norok, that, though an "Osur" infidel, he was in such favour with the gods, that they made him the guardian of the temple of Kámikhyá. It is not improbable, that the temple was originally erected by Norok, but of this we have no certain evidence. The assertion made in the Tantro, however, would, at least, lead us to suppose, that the temple was in existence in his days.

Robinson's MS.

These have succeeded stone temples, the debris of which, embracing the usual proportion of columns, friezes, &c lie scattered about.

Near the Oománand there is another mass of rock called Ooboosee. This the river sweeps over when full, but in the dry season, there is a considerable group of rocks exposed, and upon them are carved representations of most of the principal Hindoo deities. I noticed Vishnoo, Siva and Nandi, and a female figure, seated cross-legged in a devotional attitude, with a conical cap.

Guarding a little flight of steps, there is an image of Gunesh, and the steps lead, I think, to the top of one of the rocks on which, cut in the living stone, there is a Siva and Yoni. Here too are indications of an attempt to lay the foundations of a temple, beds for the stones cut in the rock with holes for rivets.

So complete was the overthrow of the order of religious edifices we are considering, that, in many instances it is not easy to find one stone on another, as laid by those who originally constructed them. The fragments of the old temple are often degraded into the formation of steps, trodden on by the votaries of the new; but however found, there is sufficient analogy between them, to enable us to form some idea of the positions they were intended to hold, and to refer all the buildings they composed to one style of architecture, of which there appear to have been different phases, from plain to decorated.

In forming our ideas of these temples we are greatly aided by the discovery of one, which, from its secluded position, escaped the destroyer's hand, and which, though small, is very nearly perfect, and merits especial notice.

This is one of a group of temples in south Kamrup, 30 miles S. W. of Gowhatty. It consists of a shrine seven feet square, plainly but massively built of well cut blocks of granite, with a pyramidal roof, supported by horizontally placed slabs, bearing on its summit a heavy non-descript ornament which originally supported an urn.

The building contains a stone pedestal, on which there is at present, on a detached slab, a figure of Durgá, in high relief, but she, this figure at least, does not appear to have always been the goddess of the shrine. There is but one aperture, a doorway, with lintel and uprights of carved stone, having a figure of Gunesh over the

door, and two standing figures, each a foot high, on the uprights. In front of this building there is an open porch, of the same dimensions as the shrine itself, having, like it, a pyramidal roof supported on four columns. These columns are octagon, the shafts 3½ feet in length and 15 inches in diameter; the bases are also octagon, the surbase 20 inches in diameter. The shaft is capped by a circular slab of the same diameter as the base, the projection being hood-shaped; over this, the capital—four volutes, springing from a circle of 15 inches in diameter, supporting a cross-shaped àbacus. The inner limbs of the àbacus support the architraves; on the outer bracket-shaped projections, cut in the architrave, limbs rest and giving support to the protruding cornice, which completes the entablature, and forms the first step of the pyramidal roof. The interior of this roof has somewhat the appearance of a dome. On the four architraves, eight neatly cut stones lie horizontally, over-lapping the corners of the square and forming an octagon; over-lapping this octagon, another layer of slabs forms a circle, and three more such courses form as many more concentric circles, each projecting four inches beyond the one below it. The upper circle is capped by a deeply cut, eight-petalled podmo or lotus, 2½ feet in diameter, which forms the interior ornament of the top of the dome.

The roof of the shrine is precisely the same as that of the porch. The whole structure, including a solid basement or platform of stone, which raises it 2½ feet above the surface of the ground, is 14 feet in height.

The removal of a heap of stones in front of this edifice, disclosed the foundation of another shrine, that appears to have been surmounted by a circular or octagon temple. This covered a crypt, sunk 3½ feet below the surface, neatly faced with cut stone and having at the bottom, bedded in a circular slab or yoni, a Mahádeva, in the form of a Linga. To the south of these shrines, and originally I believe contained within the same enclosure, there is a third temple, in a very dilapidated state; a massive building of solid masonry, 12 feet square, exclusive of projecting base, with a circular roof on the same principle as that already described, formed the vestibule of the shrine. This was surmounted by a dome springing from an octagon-shaped base four sides plain and four broken into

salient and retreating angles, which being carried up into the dome made it appear ribbed. The stones forming the dome were all horizontally placed, and were supported by the courses of slabs forming the interior of the roof. The lintel and uprights of the doorway, leading from the vestibule into the shrine, are elaborately carved with scrolls and flowers.

These domes are said to have recently fallen in, from the effects of a severe earthquake. When complete that of the shrine was about 30 feet in height. It is decorated by rows of small grotesque monsters with large ears, whether intended for men or monkies I could not make out, for, though the temples do not appear to have suffered from wanton destruction, the exfoliation of time has effaced much of the ornament notwithstanding the durability of the materials. The stones are bound together by clamps and pins; but there is want of connection between the internal and external faces of the work, the intermediate space being filled up with rubble, and without bondstones. The effects of an earthquake would, therefore, be very likely to bring down the whole structure.

No inscription has been found amongst these ruins, nor is there any tradition regarding them worth quoting.

The next ruins I shall notice, are situated in the low hills, opposite Gowahatty, just outside the fortifications of the ancient city, and not far from the great stone bridge. I was informed that these hills contained the remains of eighteen temples. There were at all events that number of shrines: every eminence, and some of the ridges, having been furnished with them.

The most remarkable is still resorted to as a holy place. It is called *Modon Kamdeo;* the present objects of worship being two rude stone figures, villainously traducing the god of love and his mistress; but these figures were obviously never intended for the pedestal on which they rest.

The basement of the old temple to about six feet above the plinth, is all that is standing (plate II). It occupied a commanding position, on a prominent peak of the range, overlooking the plains. The top of the hill is scarped, and the holy buildings are contained in a quadrangle, which was surrounded by a wall of well cut stone, with gates guarded by large lions and groups of lions devouring elephants.

The temple encloses a crypt, eight feet square and sunk three feet below the surface, with well cut steps leading down to it. Within is an oblong stone block for the idol; it has a socket for the purpose, and a spout for carrying off the water used in bathing the image.

In front of the shrine and facing the vestibule of the temple, a single stone, ten feet in length, has two large lions in high relief carved on it, two large male figures crowned, and four female figures. This stone resembles figure, (plate IV. fig. 2,) of the Tezpore sculpture, which enables us to place the latter.

The shrine was covered with a dome-shaped roof, formed of horizontal slabs in overlapping circles, the base measures 28 feet both ways. It had originally an anteroom and vestibule of stone, in front of the shrine, the foundations of which still remain; and, from the fragments lying about, the handsome exterior moulding of the shrines, appears to have been continued round these additions.

The small bass reliefs, introduced into the external mouldings of the shrine, all represent groups of figures in obscene attitudes. The representations of the human figures are generally very much out of proportion, but apparently, purposely so, to make them more grotesque. The rendering of some of the animals is very good.

In modern times, the most frequented and celebrated of the shrines of Kamroop, is the temple of *Hajou*,* situated on a hill, about 300 feet in height, on the north bank of the Brahmaputra, 12 miles N. W. from Gowahatty. Pilgrims of the bráhmanical faith from all parts of India, meet here, and make offerings in common with Buddhists from Nepal, Bhootan, Thibet and China.

The bráhmans call the object of worship Madhob, the Buddhists call it Mahamuni, the great sage. It is in fact simply a colossal image of Budh in stone, and perhaps, of all the idols now occupying the holiest places in temples, the only aboriginal one.

* The other name by which the hill is designated is Nunnikote. The etymon of the word Hajou is traceable to the language of the Bows, who were for a long period the masters of the valley. It is composed Ha, a land and *jow* high.

This is doubtless the temple which the Mahomedan general Bukhtiyar Khiliji attempted to take possession of, when he found the stone bridge dismantled and was obliged to proceed lower down the stream in search of a ford.

Part of the Hacoo Temple

F. T. Dalton. Delt

TEZPORE SCULPTURES

T. Black. Lithr. Asst. Lith. Ft.

10 ft. 7 In. in height

Its modern votaries have, to conceal mutilation, given it a pair of silver goggle-eyes, and a hooked, gilt or silvered nose, and the form is concealed from view by cloths and chaplets of flowers: but remove these, and there is no doubt of the image having been intended for the "ruler of all, the propitious, the asylum of clemency, the all-wise, the lotus-eyed, the comprehensive Buddha."

The shrine is all of stone, octagon in the plan, 30 feet in diameter, with a pyramidal roof; but it will appear from the disarrangement of many of the mouldings and cornices, and awkward position of several bas-reliefs, that the upper portion of the temple has been re-constructed from the old materials, without much precision of arrangement.

The base, to about six feet in height above the plinth, is decidedly ancient, and is the best proportioned and handsomest part of the building. On* a moulding of about two feet above the plinth a row of caparisoned elephants in high relief encircles the building, and appears to support it. The elephants are all facing outwards, stand each 16 inches in height, and are finely designed and executed; another moulding or frieze immediately above the elephants, apparently intended to represent the interlacing of reeds, is also of tasteful design and admirable execution.

The interior is a crypt, 14 feet square, into which you descend by a flight of stone steps. It contains the image and its pedestal. The door-case of the entrance to this shrine, is formed of four blocks of granite, and is ten feet high by five feet wide: a lotus over the door in the centre of the lintel, is the only ornament. The door opens into an anteroom, also of stone, ten feet by ten feet, having in niches of four feet square, stone screens, one on each side with apertures for the admission of light and air, cut in the form of lotus flowers.

Beyond the anteroom is a large vaulted vestibule measuring 40 feet by 20, built of brick and supported by massive pillars of the same material. "This† room forms no part of the original building. It is said to have been constructed by Noro Narayn, the Koch king of Kamroop, in A. D. 1550. He found the temple entirely deserted and almost lost in impenetrable jungle. Not only did he

* Plate III. † From Mr. Robinson's MS.

cause it to be repaired, and restored to something like its original form, but he endowed it with lands, priests, musicians and dancing girls." A large colony of the latter class have sprung up in the vicinity of the temple, and one set of performers daily exhibit before the shrine.

It is certain that the vaulted brick addition of Noro Náráyn, replaced a dismantled stone edifice, which they had not the skill to restore. The flight of stone steps, from the bottom to the top of the hill, is composed of slabs, which were never cut for such a purpose, and from the appearance of these and other stones lying about, it is evident, that the temple* must have possessed other buildings of stone, besides those now extant. Not far from Hajou, and on a loftier hill, the ascent of which it facilitated by rude stone steps, is another temple composed entirely of granite now dedicated to the worship of Kedár Náth. The shrine appears to have survived the general overthrow of contemporaneous fanes, but the ancient vestibule is razed to the ground and a thatched shed covers its foundation.

Near the banks of the Brahmaputra below Tezpore, the temple known as Singori or Gopeswar next claims our attention; externally it presents a most uninviting appearance, and might be passed as a very ordinary brick building of no great antiquity; but this brick work is only a sheathing, as of lava, with which the old temple is covered: above ground, outside, about ten feet of the old shrine may still be seen.

The brick shell covers the remainder and all the vestibule. The interior is however in its original state, and is very worthy of notice. It gives us the whole plan of construction of the larger temples of antiquity, and the position of most of the columns and other frag-

* The situation of these temples with reference to the town of Kusha, their site on the further bank of the Hirango, and one of them being to the present day consecrated to the worship of Maha Muni, together with the high degree of reverence paid to the place, by Budhists, would lead us to infer, with as much certainty as any short of positive testimony, that one of them was the Choityo adorned with the head ornament near which was the grove of Sal trees (there are plenty of them) where Sákya Muni went to his last sleeping bed, and near which also the rites of cremation were performed.—From Mr. Robinson's MS.

ments we find at Tezpore and elsewhere. By the deposit, for so many centuries, of the debris of the Singori hill, at the foot of which it is built, three or four feet of the most ornamental portion of the old temple is buried. Two hundred and fifty years ago, when the attempt to restore it with brick was made, the silt was removed from before the entrance only, and a flight of steps then added, to the extent of the silting, surmounted by an additional porch. As the site of the temple is high above the alluvial flats of river formation, its being thus buried is in itself an indication of great age, common to all antiquities of the same type similarly situated.

The sculptured stones found amongst the hills of Gowhatty have been dug up from deep below the surface. The great Kámikhya temple must have been thus found by its restorer, and exhumed by the removal of the earth from a broad area all round it.

The Singori temple consists of a shrine, externally octagon in the plan, and 18 feet in diameter. One side of the building is occupied by the door, the rear and two sides at right angles to this are plain, with the exception of having each a niche formed by two half-engaged fluted pillars supporting a pyramid with a melon-shaped finial,—a miniature representation of the pyramids that surmounted the vestibule. The remaining four sides of the octagon are curiously broken into angles very effective in regard to light and shade.

These salient angles meet and blend at the base of the ornament on the top of the temple, to which they ascend by a graceful parabolic curve.

The courses of stones however continuing perfectly horizontal, I have no measurement of the altitude of this or of any similar temple, but, judging from the eye, I believe they may be all estimated, like the Cashmerian temples described by Captain Cunningham, at double the diameter of the base; that would be, in the case of Gopeswar or Singori, only 38 feet. The interior is a chamber 8 feet 6 inches square. The roof is constructed, as those already described, of well cut slabs, forming a succession of circles, diminishing to about $3\frac{1}{2}$ feet, and then capped by one slab, ornamentally filling up the remaining space with a deeply cut, expanded lotus.

Under this, in a crypt, to which you descend by a flight of stone

steps, is the object of worship, which I could not distinguish, as the crypt was nearly full of water, when I saw it.

The outer building or vestibule was originally 24 feet square. It has two stone windows with six lancet-shaped apertures, but these are now buried, and the entrance door alone most inadequately lights and airs the building.

The roof is supported, besides the outer walls, by four very massive columns and eight pilasters, eight feet four inches in height, dividing the building into nine compartments, each surmounted by pyramids, similar, in regard to their structure as seen from within, to that over the shrine.

The centre compartments, including the pillars, measure ten feet ten inches each way. The four corner compartments are also square in the plan, measuring each three feet nine inches, and the side compartments are consequently 10 feet 3 inches by 3 feet 9 inches; additional slabs are placed close together on the architraves of these oblong compartments, till the opening obtained at the base of the pyramid roof is a square.

The shafts of the columns are octagonal, to within a foot and a half of the capital; thence they are square, and the plinth of the capital, fitting on to them, is also square, in other respects they resemble the restored columns in plate VII.

The shafts measure 5 feet 10 inches in circumference, and their massiveness gives to the interior a very solemn, cave-like appearance.

This temple is held in great veneration by the Buddhist Thibetans and Bootias. They visit it annually and leave here their long tresses, cut off on assuming monastic garments.

Tezpore or Pura ruins.

The fragments of columns, friezes, cornices and various other carved stones, known as the Tezpore or Pura ruins, are so found as to leave it to be implied, either that the structures for which they were intended were never completed, or, that having been built, they were so effectually overthrown that scarce one stone was left upon another. On a closer inspection both hypotheses are required to account for their present position. In some, and by far the

Fig. 1

A

B

C

D

E

Fig. 2

PERSEPOLIS TEMPLES RESTORED COLUMN.

T. Allom Lith.

Arundel Lith. Press.

greater number, of the stones, there are, in the rusty rivets and clamps, and other appearances, evidences of their having been put together; in others, the absence of these indications, and the unfinished state of the chiselling, denote they were still in the hands of the stone-cutter, when the works were interrupted.

The contemplated number of temples had not then been completed when the work of destruction commenced. The blocks are all of the hardest granite, quarried from the neighbouring hills, and no little skill and taste were required to produce, out of such material, designs so graceful and so deeply and delicately carved, as we find them.

In the production of these works the art had reached its culminating point; it set in a blaze, like a meteor, never to appear again.

In the Journal of the Asiatic Society No. 40, for April, 1835, there is a paper, on these ruins, by Capt. G. E. Westmacott; it gives a fair idea of their vast extent and spirited execution, but the writer has so entirely mistaken the nature of some of the fragments, as to give very erroneous ideas of the style of architecture intended.

In his description of the columns, page 186, he uses as bases the cross-shaped blocks, which by reference to other temples, we find to be capitals. The large square slabs, referred to in page 192 as altars, measuring 46 feet all round, were each intended to form the entire flooring of a shrine. The raised position of one, alluded to by Captain W., with steps, is a fanciful arrangement of the loose stones by some modern devotee. The stones supposed by Captain W. to be voussoirs of arches, are the segments of the circles used in the formation of the pyramidal or conical roofs; those from the centre ornaments, mistaken for the key-stones, being the corner stones of the first course of the cone; the ornament filling up the angle exposed, where the cone rested on the square of the four architraves.

The square blocks referred to in the same page, as "measuring from 20 to 30 feet, concave in the centre, and sculptured in imitation of chaplets of flowers," supposed by Captain Westmacott to have been "beds, or altar places of Siva," were intended for the crowning slabs of the pyramidal roofs of the temples.

The carving represents the expanded petals of the lotus; and the

flattish surface of the seed-beds in the centre of the flowers, Captain Westmacott mistook for the rests of "Lingas." A few of these symbols are found in and about Tezpore. On the hill beyond the sepoys' lines, there is a shrine of brick, containing one, 7 feet in girth, in a circular Yoni between 7 and 8 feet in diameter. The others are fitted into Yonis, sometimes square and sometimes round, but the Lingas are all of the same form, square at the base, octagonal in the centre, and circular in the plan of the upper portion, which appears above the Yoni.

The socket of the Yoni is cut so as to accord with the square and octagonal portion of the inserted part of the Linga. It will be observed, from this mode of construction and insertion, that it was impossible, without moving the Yoni, to disturb the Linga; where the former is large and heavy and firmly fixed in masonry, by rivet or clamps, it would have been no easy matter to have moved either.

In the destruction of one of the temples dedicated to this worship, and which, till very recently had not been disturbed since its overthrow, a Yoni of vast weight, measuring three feet two inches square, was dislodged, and sent flying over the head of its Linga, which it fractured and caused to incline as it passed; by no agency, that I can think of, but gunpowder. There was also a stone door case, the lintel and uprights of which lie broken, by some force, that projected the pieces in the same direction as the Linga.

This Linga, four feet in length, was contained in a shrine of brick, and that was not the only brick edifice amongst the holy buildings of Pura, some of these appear to have been built as depositaries for cinerary urns.* One solid mass of brick masonry, on being removed, was found to enclose a small square chamber, in which there was an urn, containing ashes and fragments of burnt bone.

The urn was unfortunately broken by the workmen. It was of very superior black pottery, ornamented with flowers in basso relievo, and from the fragments seen, the form is represented to me, as having been something like fig. 2 Plate VII.

* In Col. Wilford's account of ancient India, the Rishis held sovereignty in Assam. The figure at the base of the large pillar (Plate V.) is recognised by intelligent Hindoos as Nareda Rishi and the Rishis burned their dead, preserving their ashes in Dagopes or Topes.—S. F. Hannay.

The bricks used in these buildings are very peculiar. They are moulded in the various forms required to suit the positions for which they were destined, as constituents of domes, cornices, finials, &c. We find them, therefore of various forms and sizes, some with decorative mouldings, some plain.

From the appearance of the overthrown brick edifices, I think they had brick domes, but not arched, the bricks, like the stones, were moulded so as to form circles, overlapping till they, from all sides, met or nearly so. Very long, truncated, wedge-shaped bricks, adapted for such a formation, are found.

No lime appears to have been used in putting these buildings together, and from this and their construction, it must have been easy to overthrow them.

Captain Westmacott found no brick buildings, but the modern station of Tezpore has risen amidst the ruins he described; the dense forests, that impeded his observation, have been removed, and, though vast quantities of finely cut stones have been buried, to form the foundations of modern buildings, the more ornamental fragments were spared, and still remain in sufficient number and variety, to enable us to form some idea of the structures of which they were members.

In this we are assisted, by the uniformity of design to which the architect was reduced, by his ignorance of the principles of the arch, and poverty of invention.

In his stone buildings, he appears to have had but the one form of covering, well known in Indian architecture; and as he could not go beyond certain dimensions in the square, from which his pyramidal roofs sprang, he could only obtain additional space by a repetition of the squares and pyramids.

Had we, therefore, all the constituent parts of only one temple before us, however scattered, we might easily estimate its magnitude, and even put it together again; but we find at Tezpore, slabs for six or eight altars; each of these had its shrine and vestibule, and so the immense profusion of the ruins, indicate rather the number, than the magnitude of the Pura temples; and as the fragments that remain, are not all now, where they were first found, and so many have disappeared from the scene, it becomes impossi-

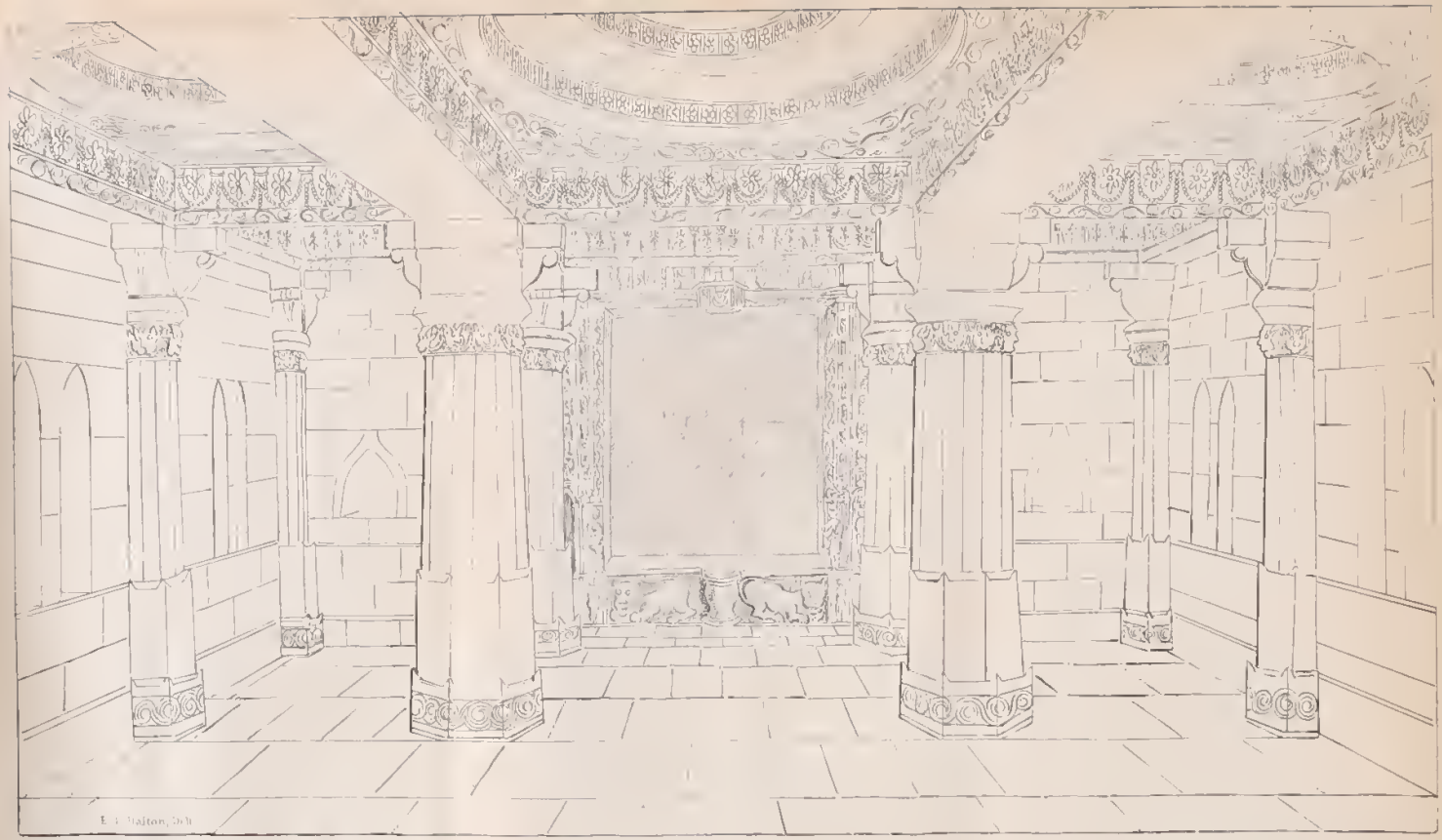
ble to assign to each shrine, its due proportion of columns and roof finials. I think, however, an effort was made to construct here one temple, in a more elaborate style of decoration, than any that had yet been attempted, and this temple I will endeavour to put together.

In plate IV. figures 1 and 2, and in plate V. I have given representations of the three most beautiful of the Tezpore sculptures. From adaptation, by measurement, and exact correspondence of ornamental borders, I find that figure 1 of plate IV. is the epistylum, which was supported, on two such pillars, as that represented in plate V. and these pillars had for their bases, the compartments of the stone, with the lines and urns, represented in figure 2 of plate IV. which contains the dancing girls and musicians.

A stone similar to this, I found, in situ, in another temple, as already noted; and I have no hesitation in placing these four in an analogous position.

They surrounded the entrance to the *adytum*, of the great temple of Pura, and by taking the largest slab of those described as the pavement of shrines, for our purpose, we find, that this adytum, which contained the object of worship, was 12 feet square inside. Externally, this shrine must have been covered by a dome, similar to the one described (ante p. 11) in the notice of the Singori temple, springing from a base octagon in the plan, thirty feet in diameter, and twice that in height; the whole basement of this dome was very floridly ornamented, with cornices of Satyr heads, and beadings in festoons, (vide figure 2, plate VI.) and other mouldings, and had also, on three sides, the niches as described for the Singori temple.

The vestibule, exteriorly and interiorly, was as highly decorated as the shrine itself. The capitals of nine pillars and pilasters were found by Captain W. In the spot I have selected for its site, I have no hesitation in saying, there must have been more; and supported by these pillars and pilasters, the vestibule was covered and adorned, with certainly not less than nine, but probably, twelve pyramids, externally supporting urns and other ornaments, and internally, presenting the conical roofs of ornamented circles, as seen at Singori and elsewhere. In plate VIII. I have attempted a perspective sketch of the internal appearance of such a temple



TEZPORE TEMPLES

Restoration of an interior
The Vestibule looking towards
The Shrine

The epistylum, over the entrance to the shrine, has nine male figures, six represented as singing, and three in graver attitudes occupying more prominent positions, and each attended by two females; underneath, in the line of a richly chased border of scrolls, entwining birds and animals, executed with fidelity and grace, is a figure of Gunesh, who appears to hold a similar position, as custodian to the entrance of most of the shrines. In attendance upon him are, two slender-waisted females. The merry couples, in the side compartment of the stone, represented in figure 2, of the same plate, and to which, in my restoration, I have assigned the position of lower member of the door-case, are engaged in a dance, to this day, well known in Assam under the name of the Boisak Bihu dance.

The Mag and Boisak Bihus are the two national festivals of the Assamese. The observances connected with these festivals, have nothing to do with the Hindoo religion, and their origin is involved in some obscurity. They belong, not to the present, but to the ancient religion of the country, and what this was, may be indicated by the fact that the Buddhist Shyans and Burmese, on the borders of Assam, if not through all Burmah, at the same time of the year, or nearly so, have their two great festivals in honor of Buddh.*

In the observances of the festivals, as held by the Assamese and Burmese, there is a remarkable resemblance.

Preparatory to the first festival, the young lads of both races, build up with care a lofty pile of firewood. After much feasting and dancing on the previous day and throughout the entire night, this is set fire to at early dawn.

The Khamptis call it *Moika Soomphoi*, and with them, it is, I believe, the anniversary of the birth of Buddh. The Assamese call it *meji*, but can assign to it no definite origin. In the second festival, the Khamptis commence by bathing all their images of Buddh, this is followed by sports and feastings, but the women do not dance.

The Assamese, on the first day of the Boisak Bihu, bathe all their cows, and subsequently, for seven days, devote themselves entirely

* Called the Pocham and Pochi respectively: see ceremonies required to be performed on the death of Chakin in Turner's Buddhistical Annals.—S. F. Hannay.

to feasting and amusement. The inhabitants of a large circle of villages, meet daily in one place; lascivious* dancing and singing are the chief attractions, and some of the attitudes and gestures used, are precisely those represented in the sculptures.

The upright stone in plate V. measures $10 \times \frac{2}{8} \times 2$ feet. The small central figures, each 8 inches in height, represent five of the Avatars of Vishnu; the missing pillar, to correspond with this, may have represented the remaining Avatars: all these surrounded the entrance to the shrine, but no figure has been found, adapted to the altar that the shrine contained.

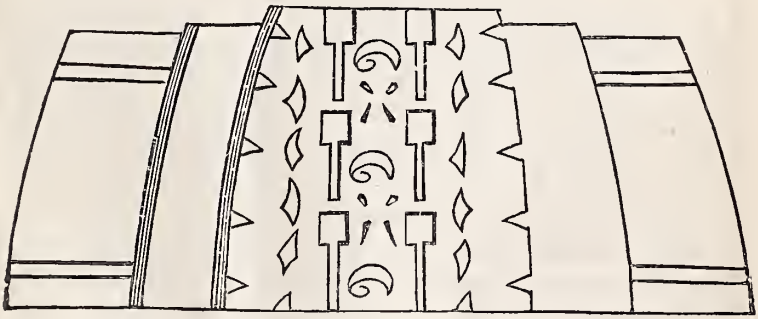
The shafts I have taken for the columns of the temple, I have been describing, are not more than $6\frac{1}{2}$ feet in length. Besides these, four have been found amongst the ruins, ten feet long, and close to where they were discovered, Captain Westmacott observed "vast fragments of the epistylum and frieze, carved with beaded drapery, half buried in the soil."

These fragments which probably formed the entire entablature of the columns, have now disappeared; Captain Westmacott is, I think, correct in the position he assigns to them, but I have no precedent for, and would be at a loss to place, the Grecian style of portico he imagined them to have formed. I took considerable pains to find amongst the ruins the remaining members of the column, of which these were the shafts, and the result is shewn in plate VII. where I have given an elevation of the restored column. It is in four pieces; 1, the capital, from A. to B.; 2, the shaft, from B. to C. with an ornamented top, a cornice of Satyr heads and beading, surmounted by a double moulding; 3, the surbase, C. to D.; 4, the base, D. to E. My idea of these four columns is, that they supported the roof of an open detached building resembling the porch of the Choigong temple; such detached buildings are generally added to the modern temples, as a receptacle for the object of worship, when taken out for an *airing;* or they may have formed the covered entrance, to the walled enclosure containing the temples.

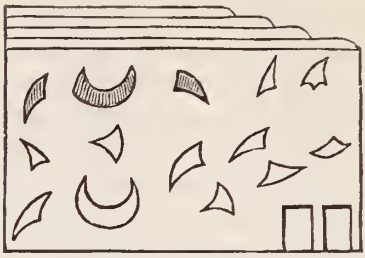
* Into laciviousness it may have degenerated in Assam, but originally it was not so intended. Nor do the Burmese or Shyans practise such at the present day. The contortions of the body, the "reeling to and fro" are intended to represent violent grief and distraction.—S. F. Hannay.

Captain Westmacott found stone walls running in various directions. These have now been removed; but that the holy buildings were all contained within a spacious enclosure, sufficient for them and a large monastic establishment, is highly probable. We have it from Hiuan Thsang, the Chinese traveller in India, in the seventh century, that such existed in Assam in his day, though neglected and holding heterodox opinions. May not the extensive monastic establishments of Assam, Vishnuvis of the present day, have originated in ancient Buddhist monasteries?

Of one of these modern institutions, I have given an account in Vol. XX. of the Journal. I have recently visited another, the Awoniáthi in the Majulé, the head priest, second priest and all the inmates of which are monks; and the sacerdotal dress is a cloth of a garnet colour similar in hue to the robe worn in the Lamesories of Bootan. The huts of these monks form an extensive quadrangle, surrounding their place of worship, and no women are allowed to take up their quarters there. No inscriptions have been found appertaining to these ancient temples; but in plate V. figure 3, and in plate XXXV. there is a representation of a stone, the carving on which is so singular, that it must surely have been intended, for something more than mere ornamentation, if this be doubtful, a symbolical object must be ascribed to the figures on the other stones represented below.

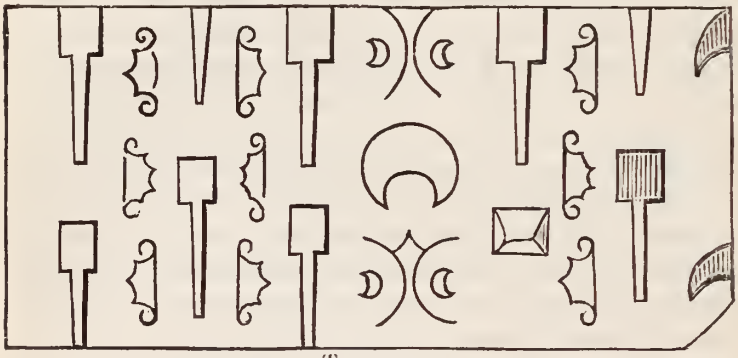


Seebsagur.
(But supposed to have originally been found in Central Assam.)

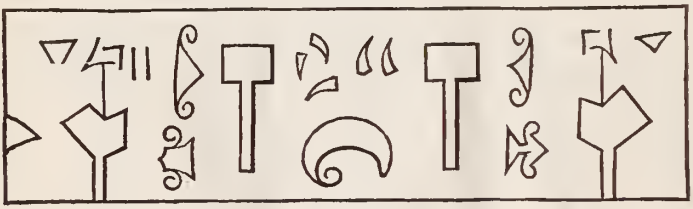


Singori Temple.

Stones, thus marked, are found amongst the ruins of all the old temples; the outer faces of the stones intended for the domes of the Tezpore temples, are covered with them. Two of them are shewn in the following cuts.



Tezpore.



Tezpore.

There is a large figure of Gunesh, cut in a rock, near what must have been the water-gate of the monastery. It is in high relief and well designed.

Ascending the river from Tezpore, we find ruins of ancient temples at Bishnauth, which was, no doubt at one time, a place of very holy repute, and one of the strongholds of the valley, there being here a fort of great extent ascribed to Arimút.

These military works abound in the valley, many of them, traditionally ascribed to apocryphal local heroes, are more likely to be the remains of fortified camps, occupied by invading armies, at times, when those who had anything to fear from the hostile force, betook themselves to the strong places constructed on both sides of the valley, in the passes into the hills.

I have seen some of these forts, and have heard of more. They are partly of masonry; well-cut and well-fitted blocks of stone, or huge ramparts of earth, faced with brick; and all so constructed, as to render it obvious that the intention was not to protect the plains from forays from the highlands, but to check the advance, towards the hills, of a hostile force from the plains. It is not likely that the hill savages could have raised such works, the inference is, that they must have been built by the inhabitants of the valley to cover the passes to the hills, in which they took refuge from the invading armies.

I shall conclude with a notice of some very interesting ruins, I recently visited, in the first range of hills due north of Dibrooghur, on the banks of a small river called the Gogra, an affluent of the Seesee. As it debouches from the hills, the Gogra takes a sweep round the last hill so as almost to encircle it. This hill is scarped, and upon the flat surface obtained, about 60 feet above the level of the water, we have the remains of three temples, 30 paces apart.

The existence of these ruins was unknown, even to the natives, till a few years ago their accidental discovery was communicated to Major Hannay, who visited them; they are in a part of the country fifteen miles distant from any village or habitation, and never frequented, except by gold-washers. However effected, the destruction of these temples was complete, three huge heaps of carved stones, some of them very large and heavy, consisting of shafts, capitals and bases of columns, cornices, architraves, friezes, massive door-cases, altar blocks and the component parts of pyramidal roofs or domes, are all found commingled confusedly, as if, after the overthrow, it had been intentionally done, to defy restoration. As they lie, however, it is obvious that each temple consisted of a shrine and vestibule, the latter supported on pillars and pilasters.

The pillars and architraves of the first and smallest temple, are

very singular, preserving in the plan, the cross shape of the capital (Fig. 1 Plate X.); heads, shoulders and arms, of human figures appear as the supports of the abacus, and the same arrangement is followed up in the architraves, from which spring the domes; and from other fragments found, there must have been a cornice, thus ornamented, all round the building.

The columns were not larger than those of the Choigong temple, and from the pilasters, these temples had all closed vestibules, not open porches like that represented in plate I. Round the base, above the plinth, the first and smallest of the Seesee temples, had a row of elephants shewing the head and fore-legs, in high relief, as in the Hazoo temple (vide plate XXVIII.)

In regard to the divinity, to which it was dedicated, a large figure of Durgah was found worthy of holding that position; and no doubt she was at some period, if not always, the object of worship there. The second temple, from the space covered by the ruins, appears to have been about 60 feet in length by 40 in breadth, including the shrine and vestibule. I extricated the altar block from the ruins of the shrine, and found, broken into several pieces, another figure of Durgah, the pedestal of which neatly fitted on to the block, and there could be no doubt that the one was intended for the other.

The figure and pedestal measured 5 feet 5 inches. The Durgah herself, when she possessed a head, which I could not find, must have measured 3 feet 6 inches from the crown to the feet; about one third larger than the Durgáh of the first temple.

The arrangement of the two figures is somewhat different, but both represent the goddess in her most terrific form, embodying by no means feebly, the power of the divine energy in action. Kálí or Durgáh appears to have been for some centuries, the favourite divinity in Eastern Assam, and it is possible, that the blood of human victims may have been shed before her altars here, as well as at the shrine dedicated to her, known as the copper temple, above Sudyá.

Yet, the figures on the lintels of the doorway and other parts of these and the third temple, do not appear to me to be emblematic of the Saktí form of worship. The grave figures, (Pl. IX. fig. 2, and Pl. X. fig. 3) seated cross-legged, in postures of profound meditation,

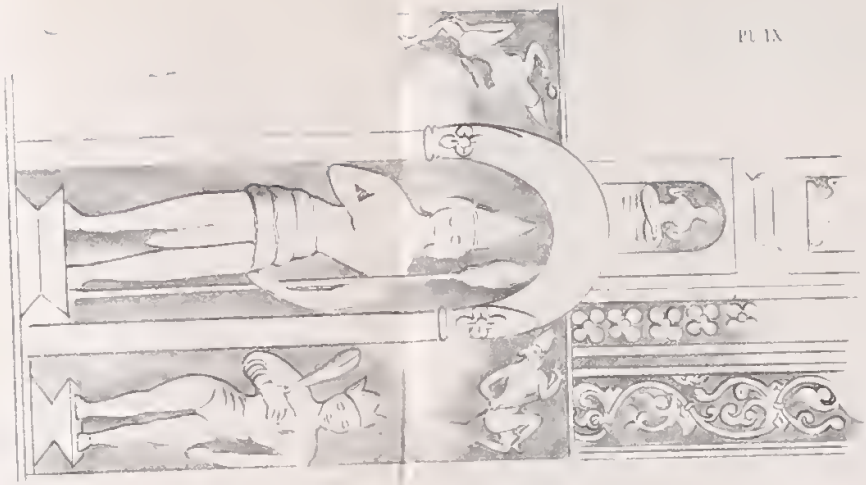


Fig 2

Temporo Sculpture

Fig 2

Fig 1

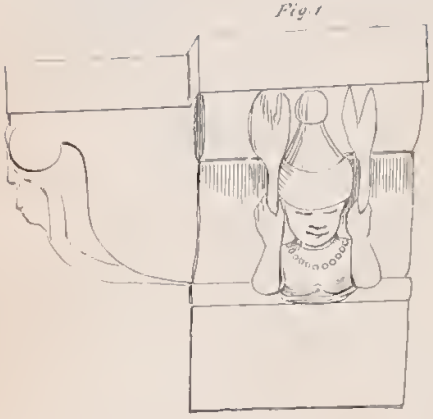


Fig 4

Fig 5

LTD Del.

SEESEE TEMPLES.

some with uplifted hands in the attitudes of exhortation or benediction, are surely Buddhistical.

The third temple of this group, must have been on a larger scale than the other two. Its existence was previously unknown to my guides who had only told me of two, and, so dense was the jungle, it would have escaped my notice, had I not determined to cut through it and examine all the scarped portion of the hill. I soon saw that it was the principal temple of the group, and set to work to clear the jungle, so as to obtain an idea of its dimensions and form; but after this was effected, all the men I had with me were unable to move some vast slabs, used in the construction of the roofs, under which the more ornamental portions of the building and the altar and idol lay buried. The ruins did not cover a greater space than that occupied by the second temple, but the heap was higher, and the blocks, generally, twice the size of the fragments of the other two.

With great difficulty I managed to obtain such a view, as enabled me to sketch parts of a lintel and a pillar of a door-case, (plate X. fig. 4) the latter measured 6 feet 10 inches by one foot nine. Across the lintel, which was of sand-stone a ponderous architrave, of coarse granite, (measuring 11 feet 10 inches by 2 feet 8 inches and 1 foot 10 inches) had fallen and fractured it.

The pillars and pilasters used in this temple were about the same size as, and resembling exactly in form, those of the Singori temple.

The great proportion of these ruins are of sand-stone, of which, the first range of the neighbouring hills, for some miles, is chiefly composed; but there are also blocks of granite, of different degrees of fineness, and they must have been transported from a very great distance.

In point of execution, the carving of the sand-stone is equal to the Tezpore sculptures, but then, the latter are all of granite, and with the exception of the Durgahs, the granite blocks of the Seesee temples are very rudely chiseled.

The carving of the sand-stone blocks of the first and second temple is very much mutilated and defaced; it is not so with the blocks you exhume of the third temple; they were doubtless in excellent

preservation, when the temple was destroyed, and having been soon covered by decayed vegetation, and perhaps undisturbed for centuries, the chiseling is as sharp and decided as if it were quite new.

Over the centre of the door was a well executed figure of Gunesh, in high relief, represented as seated on a platform under a portico. The other figures appear to be all Budddhist; and if so, is it not probable, that this was originally a Buddhist temple, subsequently dedicated to the Sakti worship?

A Memoir on the Indian species of Shrews, by Edward Blyth, *Esq.*

As an incentive to the investigation of some of the most imperfectly known of Indian mammalia, and not the most inviting of groups to amateur students, we shall here endeavour to bring together, and to reduce or digest into intelligible form and order, the scattered materials available for a Monograph on the Indian Shrews. It may lead to the discovery of additional real species, and probably to the diminution of the number of present supposed species; besides conducing to the further elucidation of those at present known and recognised, and especially to a better knowledge of the extent of their geographical distributions.

In general, the Shrews of tropical and subtropical countries are distinguished by their comparatively large size, and slaty hue of every shade from pale grey to black, with rufous tips to the fur more or less developed, though in some scarcely noticeable;* the ear-conch is conspicuously visible above the fur; the tail thick, tapering, and furnished with scattered long hairs, which certain species also exhibit upon the body; and the teeth are wholly white,† and of the following type of structure. The superior front-teeth or *quasi-incisors* (vide *J. A. S.* XX, 164), are large and strongly hooked, and much longer than their posterior spur; while

* In at least some species, the rufous tips would appear to increase with age; and, to a considerable extent, the colour of these animals is darker, according to the increase of altitude inhabited by a species.

† While preparing this memoir, we discovered a remarkable exception in the instance of Sorex melanodon, *n. s.*

the inferior have rarely so much as a trace of a serrated upper edge: of four upper præmolars anterior to the *carnassiez*, the first is large, the second and third are much smaller, the fourth is diminutive, and the third exceeds the second. This group of Shrews is familiarly exemplified by the common large musk Shrews of Asia and Africa, and constitutes the restricted SOREX, L. (v. *Pachyura*, de Selys Longchamps).*

The Indian species are as follow.

1. S. CÆRULESCENS, Shaw: *S. pilorides*, Shaw: *S. giganteus*, Is. Geoffroy: *S. murinus*, L., apud Gray: figured in Hardwicke's *Ill. Ind. Zool.* as *S. myosurus*, Pallas; whence probably *S. myosurus* apud Walker, in *Calc. Journ. Nat. Hist.* III, 255. The common Musk Shrew, or *(vulgo)* 'Musk Rat,' of Bengal, &c. (but very different from the 'Musk Rat' or *Muskquash*—FIBER ZIBETICUS of N. America, which is a rodent nearly affined to the Voles—ARVICOLA).

This animal is described by Mr. Hodgson in the *Ann. Mag. N. H.* XV, 269 (1845); but the length of the tail (as given), $3\frac{1}{8}$ in., is possibly a misprint for $3\frac{5}{8}$ or $3\frac{7}{8}$ in., or more than half of the length of the head and body, which is given as 6 in. Number of caudal vertebræ, 24. Total length of skull of adult male, with front-teeth *in situ*, somewhat exceeding $1\frac{5}{8}$ in.; of female, somewhat under

* Certain small species of temperate climates were detached by Wagler from the ordinary Shrews of those climates (with piceous-tipped teeth, &c.,) by the name CROCIDURA (*v. Suncus*, Ehrenberg, apud Gray); *e. g.* S. ARANEUS, S. LEUCODON, S. ETRUSCUS, &c.: but we are not aware that these are separable from the above; and certainly the various Pygmy Shrews of India are typical SORICES, except that some only of them want the odoriferous glands on the sides of the body.

N. B. In the 'Report on the Quadrupeds of Massachusets,' published by the Government Commissioners of the Zoological and Botanical Survey of the State (1840), the extraordinary statement is made by Mr. E. Emmons, that "In the specimens of SOREX which have fallen under my observation, I have not been able to discover, even with the microscope, any nostrils, the termination (or the extremity) of the nose being apparently an imperforate membrane." Upon reading this, we examined several species (large and small) preserved in spirit; and easily detected a lateral valvular orifice, which, on pressure of the snout above, was shewn to be perforate, by the fluid oozing through. Could Mr. Emmons have tried so simple an experiment?

greatest breadth of skull of former, $\frac{11}{16}$ in.; of latter, $\frac{5}{8}$ in. Colour uniform pale grey, slightly tinged with ferruginous, and more conspicuously on the lower parts; the naked parts flesh-coloured.

This is the common large Musk Shrew of Bengal, Nepal, and we believe the valley of Asám; becoming rare in Sylhet; and wholly disappearing in Arakan. In Nepal, Mr. Hodgson styles it "the common House Shrew of the plains, and also of the hills, up at least to 6000 ft." We have seen specimens from the neighbourhood of Agra: but whether it be the common Musk Shrew of S. India is doubtful on present evidence; though Dr. Kelaart's description of the Ciughalese animal corresponds. It certainly does not appear to inhabit the eastern coast of the Bay of Bengal, from Arakan to the straits of Malacca. Dr. Horsfield gives as its habitat "India generally, and the eastern islands;" and he notes a specimen from Butan, presented to the India-house collection by Major Pemberton. We suspect that its reputed existence in the Malay countries needs confirmation.

In addition to the names above cited, Dr. Gray, in his Catalogue of the specimens of mammalia in the British Museum (1843), refers the following name and synonymes to this species. S. MURINUS, L.: *S. myosurus*, Pallas: *S. indicus* et *S. capensis*, Geoffroy: *S. Sonneratii*, Is. Geoffroy: *S. crassicaudatus*, Lichtenstein: *S. nipalensis*, Hodgson: and *S. moschatus*, Robinson. The last two are merely *MS.* names; and indeed the zoological appellations in Mr. W. Robiuson's 'Descriptive account of Asam' are given pretty much at random, and would establish a most extraordinary community of species among the mammalia of that country and of Europe! He gives, "Genus MYGALE. *Sorex moschatus*, Cuvier. The common Musk Rat." Now *Sorex moschatus*, L. (nec Cuvier), is the type of the genus MYGALE of Cuvier; altered to MYOGALEA, Fischer (*Myogale* apud Rüppell), because pre-occupied by Linnæus for a well known genus of Spiders: and MYOGALEA MOSCHATA is a Russian animal, generically differing from Mr. Robinsou's Musk Shrew. Nevertheless, his adoption of the term *moschatus* would seem to indicate the rankly smelling S. CÆRULESCENS, rather than S. MURINUS (v. *myosurus*), which is the only Shrew mentioned in Prof. Walker's list of the mammalia of the same province.

S. INDICUS, Geoffroy, v. *S. Sonneratii*, Is. Geoffroy, is accepted as a distinct species from S. CÆRULESCENS in Dr. Horsfield's Catalogue of the specimens of mammalia in the India House Museum (1851); and a specimen is noted from the Dukhun, presented by Col. Sykes, and the following habitat given for the species—"Continent and islands of India." Col. Sykes terms it the *Cheechonder* of the Mahrattas; being the same name which is applied to S. CÆRULESCENS in Bengal, spelt *Choochundr* by Dr. Cantor (*J. A. S.* XV, 191), and the latter author gives "*Chinchorot* of the Malays of the peninsula" as the name of the very distinct species referred by him and others to S. MURINUS, L.; which latter was originally described from Java. According to Col. Sykes, these troublesome and disagreeable animals are very numerous in Dukhun, but much more so in Bombay. The sebaceous glands in an old male were observed to be very large, and the odour of musk from them almost insupportable; while in an adult female the glands were scarcely discernible and the scent of musk very faint. [It is tolerably strong in the female of S. CÆRULESCENS; though more or less so, perhaps, with reference to sexual condition.] "The SOREX INDICUS and S. GIGANTEUS," it is added, "are regarded by Col. Sykes as specifically identical, he having killed them in the same room, and seen them frequently together." (*P. Z. S.* 1831, p. 99). Prof. Schinz accordingly assigns S. GIGANTEUS, Geoff., "*Ann. du Mus.* XV, pl. 4, of 3," as a synonyme of S. INDICUS: but the reference is erroneous, the *Memoires du Muséum*, tom. XV (to which we have not access), being probably intended. S. GIGANTEUS, Is. Geoff., *Voy. de Belanger*, refers to *S. cærulescens* of Bengal.

According to M. Isidore Geoffroy, the S. INDICUS (his *S. Sonneratii*) is a smaller animal than S. CÆRULESCENS (his *S. giganteus*), with tail forming always *a quarter* of the entire length. Length of head and body of adult, a little under 4 in. (Fr). Fur ashy, washed with russet-brown; and pale ashy below. Inhabits the Coromandel coast, and also the Mauritius. If truly a distinct species from S. CÆRULESCENS, its natural habitat is probably W. India: but we have vainly sought for information of such an animal.

In Dr. Rüppell's printed Catalogue of the specimens of mammalia in the Frankfurt Museum (1842), examples referred to S.

INDICUS, L. (Fr. Cuv. *Mamm.* II, t. 28), are noted from Java, and also from Massoua and from Suez; and a supposed variety, termed by him S. INDICUS, var. *cinereo-œnea*, from Sehoa: and he elsewhere suggests that these animals have probably been introduced by the shipping from S. E. Asia and its islands, and so found their way ever to Sehoa, where a different climate had affected the colouring of the fur. On ship-board they could of course subsist on BLATTÆ: but their presence (certainly that of the fœtid S. CÆRULESCENS of Bengal) would scarcely escape remark, the more especially as that of a single individual might seriously damage a whole cargo; besides the obvious necessity of both sexes being required to continue the race, a condition most likely to be fulfilled by the conveyal of a pregnant female with her future litter of some 5 or 6, S. CRASSICAUDUS (nec *crassicaudatus*), Lichtenstein, refers to a Musk Shrew inhabiting Egypt, and stated to be common about Suez; which may therefore be presumed identical with Dr. Rüppell's S. INDICUS from Suez; and the description certainly seems to approximate that of S. CÆRULESCENS (length $5\frac{1}{2}$ in.; tail $2\frac{3}{4}$ in.): and S. CAPENSIS, Geoffroy, is termed S. FRANCICUS by Prof. Schinz, who gives Mauritius as its habitat (length 3″ 8‴; tail 1″ 9‴). The most notable identification is that of Dr. Rüppell's specimens from E. Africa and from Java, presuming the latter to be really from that island.

2. S. MURINUS, L.: *S. myosurus*, Pallas: *S. cærulescens*, var., Raffles: *S. Griffithii* (?), Horsfield: the common Malayan species originally described from Java, and by Dr. Cantor in *J. A. S.* XV, 191, and thus denominated by him after Prof. Schinz (*Synopsis mammalium*), who states it to inhabit Java, Sumatra, Borneo, Celebes, Amboina, *Japan*, *Bengal*, *Abyssinia*, *and the Cape of Good Hope*. We have italicized the habitats which probably need verification: and the Society possesses specimens from the Arakan and Khásya hills, which accord with Dr. Cantor's description, *l. c.*; but less so with M. Geoffroy St. Hilaire's figure, in the *Annales du Muséum d'Histoire Naturelle*, tom. XVII, pl. 3, f. 2, which may nevertheless be intended to represent the same species. As compared with a mature female from Arakan, taken out of spirit, the ears in M. Geoffroy's figure are represented too small, and neither the snout nor

tail is sufficiently elongated. Length of this Arakan female—head and body 5 in., and tail 3 in.: hind-foot (with claws) $\frac{7}{8}$ in. Unfortunately, we have no Malayan specimen for actual comparison: but there is every reason to suspect that this species replaces S. CÆRULESCENS along the whole eastern coast of the Bay of Bengal, and thence through the hilly country northward, to that skirting the valley of Asam. Dr. Horsfield mentions a Nepalese specimen, presented to the India House museum by Mr. Hodgson: but this species is unnoticed in the latter gentleman's Catalogue of Nepalese animals, and especially in his descriptive notices of the Nepalese Shrews, *Ann. Mag. N. H.* XV, 269. With the exception of the small S. TENUIS, S. Müller, from Timor, it appears to be the only well established species of Shrew throughout the great oriental archipelago. In the Tenasserim provinces, the Rev. J. Mason states—"We have at least two species of Musk Shrew, both of which emit an offensive odour." (*Qu.* S. MURINUS and S. SERPENTARIUS ?) In S. MURINUS, according to Dr. Cantor, "the smell of musk, emitted by the adult animal, and which in the young is barely perceptible, is much less intense than in the Bengal Musk Shrew." S. SERPENTARIUS, according to Dr. Kelaart, has a powerfully offensive musky odour. S. MURINUS has larger ears than S. CÆRULESCENS; and Dr. Cantor describes it as—"Dark brownish-grey above, beneath light brownish-grey. Feet and tail flesh-coloured in the living animal, changing to cinereous after death. In the young the colour is more of a bluish-grey, slightly mixed with brown on the back. A stuffed specimen from the Khásya hills has the fur longer and less dense than in S. CÆRULESCENS, the piles somewhat curly; and colour dark ashy at base, with rufous-brown tips which give the prevailing hue. A most obviously distinct species from S. CÆRULESCENS.

We suspect that *S. Griffithii*, Horsfield, of that naturalist's Catalogue of the specimens of mammalia in the Hon'ble Company's museum, is no other than our presumed MURINUS from the Arakan and Khásya hills; although described from Afghanistan: because we saw a fine skin from Cherra Punji in the possession of the late Mr. Griffith, which was forwarded to the India-house by Mr. McClelland; and we have previously had occasion to remark that specimens of reptiles procured by Mr. Griffith in Afghanistan and

in the Khásya hills, had manifestly become mixed and confounded; whence certain important mistakes concerning habitats.* *S. Griffithii* is described to be affined to S. MURINUS; "but differing essentially by the uniform deep blackish-brown tint, and the shortness, delicacy, and softness of the fur. Colour deep blackish-brown throughout, with a slight rufous reflection in a certain light. Length of head and body, $5\frac{3}{4}$ in.; tail, $2\frac{1}{2}$ in." Horsfield's Catalogue.

3. S. SERPENTARIUS, Is. Geoffroy: *S. kandianus*, Kelaart. Described in *J. A. S.* XXI, 350, from a skin sent by Dr. Kelaart as "the large godown Shrew of Kandy;" though scarcely corresponding with his indications, *J. A. S.* XX, 164, 185. A second skin of precisely the same species, and also an adolescent specimen entire in spirit, were subsequently forwarded from Mergui by Capt. Berdmore, as noticed in XXII, 412. In both adults, the tail (vertebræ) measures $2\frac{1}{8}$ in.; and the head and body (allowing for some extension of the skin) about $4\frac{1}{2}$ in. "The Kandyan specimen is more rufescent than the others; but we can perceive no further difference whatever: indeed, to judge from the two Mergui examples, it would seem that this animal becomes more rufescent with age. Dr. Kelaart states that its odour is as offensive as that of the large Musk Shrew of Ceylon. The Coromandel coast and the Mauritius are given as its habitats. Colour duskyish-grey, with dark rufous-brown tips to the fur, more or less developed according to age, and the under-parts somewhat paler.

4. S. SOCCATUS, Hodgson, *Ann. Mag. N. H.* XV, 270. A Sikim specimen which we refer to this species, bears considerable resemblance to the last, but is a good deal darker, with well clad feet and tail; and the head and limbs are proportionally larger. Entire length of skull with front teeth *in situbus*, $1\frac{5}{16}$ in; breadth $\frac{9}{16}$ in. (nearly): entire range of upper teeth, $\frac{5}{8}$ in.: ditto of S. SERPENTARIUS, barely exceeding $\frac{1}{2}$ in. Tail (vertebræ), $2\frac{3}{16}$ in.; compressed towards tip, which is furnished with a pencil-tuft of stiffish hairs. Mr. Hodgson thus describes his animal. "Size and proportions of S. NEMORIVAGUS, H. (nearly); but distinguished by its feet being clad with fur down to the nails, and by its depressed head and tumid bulging cheeks (mystaceal region). Ears large and exposed.

* Vide *J. A. S.* XXII, 413.

Colour a uniform sordid or brownish slaty-blue, extending to the clad extremities. Snout to rump 3½ in.; tail 2⅛ in.; planta $\frac{13}{16}$ in. This animal was caught in a wood plentifully watered, but not near the water. It had no musky smell when brought to me dead." Hab. Nepal and Sikim.

5. S. NEMORIVAGUS, Hodgson, *Ann. Mag. N. H.* XV, 269. Differs from the ordinary type "by a stouter make, by ears smaller, and legs entirely nude, and by a longer and more tetragonal tail. Colour sooty-black with a vague reddish smear; the nude parts fleshy-grey. Snout to rump 3⅝ in.; tail 2 in.; planta, $\frac{11}{16}$ in. Found only in woods and coppices." Nepal. According to Dr. Gray, an example presented to the British Museum by Mr. Hodgson, as of this species, "is probably only a half-grown specimen of S. MURINUS" (*i. e.* CÆRULESCENS)!* The foregoing description should indicate a very different animal; but which might be mistaken for the young of S. MURINUS *(verus)*, and such probably is the supposed S. MURINUS from Nepal of Dr. Horsfield's Catalogue.

6. S. HETERODON, nobis, *n. s.* Very similar to S. SOCCATUS in general appearance, but less dark-coloured, with shorter fur, and pale instead of blackish feet and tail underneath: the feet, too, are broader, especially the hind-feet; and they have a hairy patch below the heel. The skull, of the same length as in S. SOCCATUS, and with equally large teeth, is much more narrow, and the upper quasi-incisors are conspicuously less strongly hooked than in that and other typical SORICES. From Cherra Punji, in the Khásya hills.

7. S. NIGER, Elliot; described in Dr. Horsfield's Catalogue (1851). "Length of the head and body 3½ in.; of tail 2½ in. Tail equal in length to the entire animal, exclusive of the head; gradually tapering to a point. Snout greatly attenuated. Colour blackish-brown, with a rufescent shade to the upper parts: abdomen greyish. From Madras" (*Qu.* Madras Presidency?).

* We made a description of the identical specimen, before it was taken by Mr. Hodgson to England: viz.—"Of a shining rufescent-brown colour, merely weaker on the under-parts. Length 3½ in.; of tail 1⅝ in.: fore-feet and claws ⅞ in.; the claws alone ⅛ in., and of a yellow colour, perhaps whitish in the fresh animal: hind-feet and claws ⅝ in."

8. S. FERRUGINEUS, Kelaart, *J. A. S.* XX, 185: *S. montanus* apud nos (misled by a label), *ibid.* 163, vide XXI, 350, note. Hab. Ceylon. *N. B.* The dimensions of the specimen described in *J. A. S.* XX, 163, accord with those assigned by Dr. Kelaart to the next species; and he states that the two are nearly of the same size, and that the smell of the present species is very powerful.

9. S. MONTANUS, Kelaart (*nec apud nos, J. A. S.* XX, 163). "Length of head and body $3\frac{3}{4}$ in.; of tail $2\frac{1}{4}$ in.; of hind-foot $\frac{2}{3}$ in. Fur, above sooty-black, without any ferruginous smear; beneath lighter-coloured: whiskers long, silvery-grey: lower part of legs and feet greyish, clothed with appressed hairs. Claws short, whitish. Ears large, round, naked; the outer margin lying on a level with the fur of the head and neck, and being thus concealed posteriorly." Mountains of Ceylon ("the blackest Shrew of the highest parts of the island." Kelaart.)

N. B. Dr. Kelaart has lately forwarded an entire specimen in spirit of a *young* female Shrew found at Galle (!), though with the three pairs of inguinal teats well developed; which may prove to be the young of S. MONTANUS, but is perhaps distinct and new. If so, S. KELAARTI, nobis. Colour uniform blackish above and below, slightly grizzled and glistening; the fur short and close, with scattered fine long hairs throughout (as described of S. MONTANUS). Length of head and body $2\frac{3}{4}$ in.; of tail $1\frac{1}{4}$ in.; and of hind-foot with claws $\frac{5}{8}$ in.

10. S. PYGMÆUS, Hodgson, *Ann. Mag. N. H.* XV, 269: nec *S. pygmæus*, Pallas; if the small European species referred by Schinz, Rüppell, and others to the latter be correctly identified. S. PYGMÆUS, Pallas, apud Schinz, is placed by the latter zoologist among the species with brown-tipped teeth, and in the division of them which corresponds to CORSIRA, Gray; and the description—*caudâ basi constrictâ; auriculis brevissimis;*—will certainly not apply either to Mr. Hodgson's animal, or to various other minute Indian Shrews hitherto undistinguished from it: and therefore Mr. Hodgson's name for the present species may stand, as he states the structure of the animal to be typical.* The following is his descrip-

* Since writing the above, we have seen the figure of SOREX PYGMÆUS, Pallas and Laxmann (*S. minutus*, L., *S. exilis*, Gmelin, and *S. minimus*, Geoff.), in the

tion—" Snout to vent, less 2 in.: tail, $1\frac{3}{16}$ in.: head, $\frac{11}{16}$ in.: palma, $\frac{1}{4}$ in.: planta, $\frac{3}{8}$ in. Structure typical, save that no odorous glands were detected, nor had the animal any musky smell. Colour sooty-brown, paler below. Naked parts of a dusky fleshy hue. Hab. Nepal, where it " dwells in coppices and fields, and is rarely found in houses."

Of numerous specimens of minute SORICES, from various localities, the only one which approaches to the above description is a species which we have just procured in Calcutta; curiously enough while engaged in the investigation of this particular group. It may be termed

11. S. MELANODON, nobis, *n. s.:* from the remarkable colouring of its teeth, which are *piceous* and *white-tipped;* exhibiting thus the reverse coloration of those of CORSIRA, &c. Length of adult female $1\frac{7}{8}$ in.; tail $1\frac{1}{16}$ in.: hind foot and claws $\frac{5}{16}$ in. Colour uniform fuscous, without any rufous tinge; scarcely paler below: the feet and tail subnude, save the usual scattered fine long hairs upon the latter; and, with the ears and snout, of a livid colour, paler below: claws white and distinctly visible. Procured by one of our museum assistants in his own house, where he states that he has observed and can probably obtain others.

12. S. MICRONYX, nobis, *n. s.* Length of head and body $1\frac{5}{8}$ in.; tail somewhat exceeding $1\frac{1}{8}$ in.: hind-foot and claws, $\frac{13}{32}$ in.: skull $\frac{1}{2}$ in. Teeth white. Claws with fine hairs impending them, and so minute as to be scarcely discernible without a lens. Fur of a paler and more chesnut brown than any other of these minute species examined, and also more silvery below. Feet and tail subnude, or thinly furred, shewing the colour of the skin through; browner above, whitish (or perhaps flesh-coloured) below. Of two specimens in our museum, one in spirit, the other now dried, the latter was obtained by the late Major Wroughton in Kemáon, the former by L. C. Stewart, Esq. of H. M. 61st foot, at Landour; where he informs us that he picked up many of them dead, on the surface of the suow, during the severe winter of 1850-51.

Act. Acad. Leop. Vol. XIII, pt. 2, t. 25 (1827); and the species is widely different from all the pygmy Shrews here described, and is evidently a CORSIRA.

13. S. PEROTTETII, Duvernoy, Guérin's *Mag. de Zool.* 1842, livr. 8. We can only refer to Prof. Schinz's description of this species, which is as follows:—" *S. notæo saturate fusco-nigricante, gastræo canescente, artubus pedibusque pilosis, auriculis magnis, conspicuis. Long. corporis* 1″ 4‴, caudæ 11.‴ " From the Nilgiris. We have a Darjiling female which approximates this description, and may prove to be of the same species. Head and body $1\frac{1}{2}$ in.; tail 1 in.; hind-foot and claws $\frac{11}{32}$ in. Skull somewhat exceeding $\frac{5}{8}$ in. Teeth white. Colour uniform brown, with a slight tinge of chesnut; and scarcely paler below. Feet and tail distinctly furred, besides the usual scattered long hairs on the latter. Claws whitish and conspicuous. Tail brown above, pale and perhaps flesh-coloured beneath; more probably, however, of a livid hue; and tapering evenly throughout. If new, S. HODGSONII, nobis.

14. S. NUDIPES, nobis, *n. s.* Remarkable for its naked feet and very large ears; also for the odoriferous glands on the sides being strongly developed, whereas we can detect them in no other of these minute species. Length of female, $1\frac{3}{4}$ in.; tail, $1\frac{1}{16}$ in.: hind-foot, $\frac{11}{32}$ in. Ears conspicuously larger than in the others: tail almost nude, save of the scattered long hairs: and the fore-feet and toes of the hind-feet are conspicuously naked, and apparently flesh-coloured. Fur uniform brown above (like the back of CORSIRA VULGARIS), a little grizzled and glistening; the lower-parts with a silvery gloss: tail brown above, pale (probably flesh-coloured) below; somewhat thick and uniformly tapering. Specimen procured at Amherst (Tenasserim provinces).

15. S. ATRATUS, nobis, *n. s.* Of this we have only a headless specimen, which was found impaled upon a thorn by some Shrike,* at Cherra Punji in the Khásya hills: but the species is obviously distinct from all the preceding. It is remarkable for its very dark colour, extending over the feet and tail, which is even *blackish underneath*. Length of tail 1 in.; and of hind-foot $\frac{11}{32}$ in. Fur black-

* The same fact we have observed in England of LANIUS COLLURIO and CORSIRA VULGARIS: these diminutive Shrews falling an easy prey to the " Butcher-birds;" while the larger members of the same genus are ferociously predatory upon any hapless birdlet they may chance to seize,—as is likewise the case with Moles and doubtless other SORICIDÆ of adequate size and strength.

ish-brown above, a little tinged rufescent, and with dark greyish underneath; the feet and tail conspicuously furred, besides the scattered long hairs upon the latter.

Here may be noted, that the Society formerly possessed a specimen of one of these minute Shrews, which was found in a cellar in Madras, and was presented by Walter Elliot, Esq., Madras C. S. We formerly considered it identical with S. MICRONYX; so that it could scarcely be so with S. MELANODON of Bengal: it was, however, darker than S. MICRONYX; and more probably S. PEROTETTII (*verus*), if not distinct from the whole of the foregoing. It is even probable that several more Indian species of these most diminutive of all mammalia remain to be discriminated. Upon minute comparison of five specimens in our museum, taken out of spirit and carefully dried for the occasion, we immediately detected four well-marked species, and presently afterwards obtained the S. MELANODON fresh. It may further be remarked, that we once found the nearly digested remains of an adult small white-toothed SOREX, rather larger than a common Mouse, in the stomach of an ELANUS which was shot on the banks of the Hugli, about 50 miles above Calcutta: but we have since in vain sought to procure the species.

Another form of white-toothed Shrew, with thick and tapering tail having scattered long hairs upon it, is exemplified by

FEROCULUS, Kelaart. Teeth small; the upper quasi-incisors shorter and less strongly hooked than in restricted SOREX, with the posterior spur large; the lower quasi-incisors serrated, shewing two depressions, and therefore a row of three coronal points: four small upper præmolars preceding the *carnassiez*, the two medial being of equal size, the first rather large, and the fourth small. Feet remarkably large. The ear-conch scarcely visible above the fur.

16. F. MACROPUS: *Sorex feroculus*, Kelaart; *S. macropus*, nobis, *J. A. S.* XX, 163. Length about $6\frac{1}{2}$ in., of which the tail is $2\frac{1}{4}$ in.: hind-foot with claws nearly $\frac{7}{8}$ in.; the fore-foot $\frac{1}{4}$ in. broad, with long and but slightly curved claws, that of the middle digit $\frac{1}{4}$ in. in length. Fur somewhat long and very soft, uniform blackish, very faintly tinged rufescent; the extreme tip of the tail naked and of a flesh-colour. Inhabits Ceylon.

Another white-toothed Indian Shrew exists in the Crossopus himalayicus, Gray, to be noticed presently. We feel much doubt of its being correctly referred to Crossopus.*

The greater number of small Shrews inhabiting the temperate regions of Europe, Asia, and N. America, have the teeth always tipped with ferruginous or pitch-colour, a slender Mouse-like tail with no scattered long hairs upon it, and (save in Otisorex) the ear-conch concealed amid the fur. There are two distinct types of dentition.

In one, the upper quasi-incisors are much longer than their posterior spur (as in restricted Sorex); and the lower have but a single posterior spur more or less rudimental: the lateral small teeth which follow in the upper jaw are four in number (as in restricted Sorex); the first two being equal, the third somewhat smaller, and the last (as usual in all Shrews) minute. With this type of dentition, we distinguish

1. Soriculus, nobis. With the hind-feet of ordinary form and proportions, unadapted for aquatic habits; and the tail tapering and a little compressed at its extremity.

17. S. nigrescens; *Corsira nigrescens*, Gray, *Ann. Mag. N. H.* X, 261, (1842): *Sorex sikimensis*, Hodgson, Horsfield's Catalogue, (1851). Length of head and body, $3\frac{1}{4}$ in.; of tail, $1\frac{1}{2}$ in.: hind-feet and claws, $\frac{5}{8}$ in. Number of caudal vertebræ, 15 (besides the extreme tip). Colour throughout blackish, a little tinged with rufous; the feet and claws pale. Very common in Sikim; and was formerly sent by Mr. Hodgson to the Society's Museum and also to the British Museum from Nepal.

2. Crossopus, Wagler (v. *Hydrosorex*, N. Duvernoy, and *Pinalia*, Gray). With the hind-feet large and ciliated, and the tail also compressed and ciliated beneath towards its extremity; in adaptation to aquatic habits. *N. B.* S. fodiens, (v. *hydrophilus*), Pallas, and other Water Shrews of Europe and N. America constitute the types of this division; and Dr. Gray refers to it a Himalayan species, which, having *white teeth*, we very much suspect will

* Myosorex, Gray, is founded on a Cape species, the Sorex varius, Smuts, with ear-conch concealed amid the fur, and a slender tail (without scattered long hairs?): the teeth white, and the dentition slightly modified upon that of restricted Sorex: lower quasi-incisors "with an entire sharp upper edge."

prove to differ in other and more important particulars; even though it may exhibit the *adaptive* characters of an enlarged and ciliated hind-foot and compressed and ciliated tail-tip. It is thus described.

18. Cr. HIMALAYICUS, Gray, *Ann. Mag. N. H.* X, 261 (1842). "Length of head and body $5\frac{1}{2}$ in.; tail 3 in.: hind-foot $\frac{3}{4}$ in. (nearly). Slate-coloured black, with scattered long hairs, which are longer and white-tipped on the sides and rump: lower part of the throat and the middle of the belly rusty-brown: tail elongate, scaly, with appressed dark brown hairs above and elongate rigid whitish hairs beneath, and brown elongated rigid hairs near the tip: feet rather naked: whiskers numerous, elongate, brown. *Teeth white.*" Probably from the neighbourhood of Simla or Masuri.

In the other type of dentition the lower quasi-incisors are distinctly serrated, with three or four coronal points; and the anterior point of the upper quasi-incisors is not prolonged beyond a level with its posterior spur: the lateral small teeth which follow in the upper jaw are five in number, and diminish gradually in size from the first backward. Tail cylindrical, not tapering, and furnished with a stiffish brush at its extremity. Such is the common British land Shrew, S. VULGARIS, L. (formerly confounded by British writers with S. ARANEUS, Schreber), and which is the type of CORSIRA, Gray (v. *Amphisorex*, No. 1, Duvernoy, apud Gray). There are many other species.* We refer to it doubtfully

19. C. (?) CAUDATA; *Sorex caudatus*, Hodgson, Horsfield's Catalogue (1851): for the description seems to indicate a species closely affined to the European S. ALPINUS, Schinz; a skull-less example of which, from Mt. St. Gothard, is in our museum; and S. ALPINUS is ranged among the species having the CORSIRA type of dentition by Prof. Schinz in his *Synopsis Mammalium*: its tail, however, is naked and compressed at tip. "Length of the head and body $2\frac{1}{2}$ in.; of the tail the same, slender, nearly naked, and very slightly atte-

* BLARIA, Gray, (v. *Blarina*, Lesson), is founded on S. TALPOIDES, Gapper, *Zool. Journ.* V, 28, referred by Blainville to S. BREVICAUDUS, Say; a N. American species, which, we believe, only differs from CORSIRA in the large size of its fore-feet, and in its very short tail:—and OTISOREX, Dekay, is founded on two minute N. American species, which do not appear to differ from CORSIRA except in having the ear-conch large and conspicuously visible above the fur.

nuated. Colour saturate blackish-brown, very slightly rufescent in certain aspects. Snout moderately elongated, furnished at the sides with long delicate hairs."

We now conclude this effort at a *Conspectus* of the Indian Soricinæ, by soliciting aid from all (probably not many persons in India) who take any interest in the subject. It will suffice if specimens could be sent in spirit to the museum of the Society (if disembowelled, and the abdominal cavity cleaned of blood, so much the better for our present purpose, except with regard to the very diminutive species, examples of which are particularly acceptable); such being far preferable to badly prepared skins for being afterwards set up as stuffed specimens, besides permitting of much more satisfactory examination of their differential characters; and it is further desirable that three or four adults of each kind should be thus transmitted, to supply our collection with skeleton and stuffed specimens, in addition to at least one to be retained entire in spirit. The *micro-mammalia*, as they have been designated (as Bats, Shrews, Mice, &c.), require to be thus amply represented in museums, for their specific distinctions to be rightly understood in many cases: and the chaos of Indian Muridæ, in particular, will never be reduced to systematic order, with the synonymes correctly adjusted, until such a tolerably complete collection of them from all quarters has been brought together.

Bibliographical Notes on the published Upanishads with suggestions upon the publication of those which remain unedited.—By E. Röer, *Esq. M. D.*

Since the publication of Mr. Walter Elliot's letter of the 30th August, 1851, in the 20th volume of the Society's Journal; p. 607, announcing, that the lists of Upanishads, as received among the Telingána Paṇḍits contained many, not to be found in Colebrooke's or Weber's lists, and that copies of them were yet procurable, I have received from him a complete set of all those Upanishads the existence of which we learn only from his list. Written in the Telingána character, they are now in the course of being transcribed into the

Devanagari. I subscribe a list, containing the number of pages in each.

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4.	Tripura U.	45—47
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31.	Jábáli U.	335—337
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33.	Kaṭha U.	341—346
34.	Krishṇa U.	347—349
35.	Kuṇḍinaka U.	351—354

To this list is to be added the Kaushitaki Upanishad with S'ankara's commentary, with which Mr. Elliot favoured me but lately. The first twelve Upanishads of the above list are also mentioned by Dr. Weber; all the others from No. 13, with the exception of Nos. 21 and 33, are new to us.

The whole number of Upanishads, as far as we know at present, is 138 (v. J. of the As. S. XX., p. 619). Of eleven only has the text been published, viz. 1. The Brihad Áraṇyaka. 2. The Chhándogya. 3. Kaṭha. 4. Kena. 5. Muṇḍaka. 6. Máṇḍukya. 7. Pras'na. 8. Ís'á. 9. Aitareya. 10. Taittaríya and 11. S'wetás'watara. This number is indeed but small, at the same time it includes almost all the most valuable. The importance of the Upanishads depends upon the date of their origin and upon the influence which they exercised in the formation of the systems of philosophy among the Hindus. According to the received definition, the Upanishads are such parts of the Vedas as embody their metaphysical and theological view which may be compressed into the formula, that the finite soul is essentially the same with the infinite spirit or Brahma. The Vedas themselves were written at different times, the Atharva Veda being the most modern one, so that as a rule the Upanishads of the Atharva Veda were composed later than those of the other Vedas, and in consequence do not exhibit the doctrine in the same originality and simplicity as those of older date. According to the theory laid down in the Mahávákya Ratnávalí, (e. l. 612-613) there are 1,180 Upanishads equal to the number of Vedaic schools, one Upanishad belonging to every school. This theory is, however, fanciful, and not borne out by fact, and even the Ratnávali admits, that 108 Upanishads are the principal ones, which it enumerates and making no mention of any other, probably because the author did not know of any more.

As to the doctrine of the Upanishads, it appears even on a casual glance, that they widely differ from each other, some of them exhibiting the most ancient philosophical dogmata preserved among the Hindus, others in many of their leading tenets representing a more modern epoch, their only connexion with the ancient Upanishads being, that both maintain the identity of the finite and infinite spirit. Colebrooke would acknowledge only those works as Upa-

nishads which were written at the time of the Vedas. Weber opposes this view on the ground, that later tracts, if explanatory of the same doctrine, cannot be excluded, since the term "Upanishad" is not confined exclusively to the Vedas. Colebrooke's view coincides with the opinion of Hindu authors, and therefore seems to us for this as well as other reasons the preferable one, could we ascertain, which Upanishads are contemporary with the Vedas and which of later origin; to determine this point, however, in the present state of our knowledge is not possible. Our only course, therefore, is, preserving the name, "Upanishad" for all, to classify them according to their importance in the sense above pointed out.

Dr. Weber divides the Upanishads into the following classes, 1. The Upanishads which belong to the three first Vedas, as forming the foundation of the Vedánta system; with a subdivision into A, such as are found exclusively in those Vedas, viz., the Vashkala, Kaushitaki, Aitareya, Tadeva, S'atarudríya, Chakli, Maitrayani, S'wetás'watara, S'ivasamkalpa, Purushasúkta, Ís'á, Brihadáranyaka, and Chhándogya, and B, into such as also occur in the Atharva Veda, viz. Kena, Katha, Ánanda Vallí, Bhrigu Vallí and Mahá Náráyana. 2. The second class comprises all the Atharva Upanishads referring to the Vedánta system in its entire development, and their order is as follows. a. The Mundaka, Pras'na and Garbha which are pretty closely connected with the former period, and still treat general questions of the Vedánta. b. The second division is made up of such as have a special reference to the topic of the nature of the Átman, as S'arva, Yogas'ikhá, Átman, Átmabodha, Tejovindu, Churiká, Chuliká, Amritanáda, Aks'hi. 3. The third division is composed of the Upanishads in which the meditation has become crystalised and is limited to the mystical word "Aum" ex. g. the Dhyánavindu, Yogotattwa, Atharvas'ikhá, Hansanáda, Brahmavidyá, Mándúkya, Táraka, Prána, Sannaka. 4. Closely allied to the former division is the fourth, which treats on the order of the Sanyasi, as Jábála, Paramahansa, Áruneya. 5. The last division includes the sectarian Upanishads, in which the Átman is worshipped as an individual deity.

As the more simple course we propose to adopt three divisions, viz., 1. The Upanishads which are referred to by the six orthodox

systems as their source. There appears no reason, either on account of doctrine or priority of age, to restrict this head or class to the Vedánta system; for the others claim equally to be derived from the Upanishads, and the Vedánta Sútras in their present form are by no means the most ancient among the philosophical Sútras. 2. The more modern Upanishads, which are not referred to in the Sútras, and which contain the same doctrine as those of the former division, but more developed. 3. The Upanishads which are different in doctrine and refer to the worship of a special deity, as Deví, Krishṇa, etc. These are all most modern.

With regard to the first class, it is in most cases difficult to determine, which are the Upanishads, alluded to by the authors of the philosophical Sútras, as they do not quote whole sentences of the Upanishads, but refer to names and words, which for the most part occur in several Upanishads. And when proceeding to decide this point by critical examination, we must bear in mind that those Upanishads are the best representatives of the philosophy of the Vedas which are commented on by S'ankara. These are, besides the eleven stated above as published, the Nrisinha, Tápaníya, the Kaushitaki, the Atharvasikhá, the Atharvasiras and the Maitrayaṇí Upanishads. Of the text of the Kaushitaki Upanishad as well as of its commentary by S'ankara, MSS. are very rare; at Benares even they appear not to be procurable, and the MS. of the text with S'ankara's commentary, committed to my care by Mr. Elliot, is therefore a very valuable contribution to our knowledge of the literature of the Upanishads. Of the others, MSS. are everywhere procurable, and these five Upanishads, together with the commentary of S'ankara, have a paramount claim to be published in the Bibliotheca Indica.

Next to them in importance range the 52 Upanishads of the Atharva collection. Although several of these (the Kaṭha, Kena, Ánanda Vallí, Bhrigu Vallí, Muṇḍaka, Práṇa and Máṇḍúkya, have been published, yet their number is comparatively but small, and, in my opinion, the text of all should be printed, as the whole collection would not occupy more than 150 to 200 pages.

The abovementioned Upanishads being published, I have no doubt, that an edition of those which remain will soon be called for as essential to complete our acquaintance with this interesting department of ancient learning.

It is to Mr. Elliot that we owe the preservation of a great part of the literature of the Upanishads, and I take this opportunity of publicly acknowledging to him my most grateful thanks for the ready generosity with which he has, upon several occasions, placed at my disposal MSS. of infinite importance to my labours in this field of research.

Literary Intelligence.

Extract from a letter of Dr. A. Sprenger, *dated Damascus, December 24th,* 1854.

And now I come to bibliography. In my opinion the most important book that I have yet seen is one, of which probably no one else would have taken notice. It has the title of دوادا القلوب و معرفه همم النفس وادابه and contains instructions of a Pyr to his pupil. The Pyr is the celebrated Abú 'abd Allah al-*Ha*rith b. Asad Mohásiby- died in 243. His biography is in the Nafa*h*át in Qoshayzy, in Asnawy's *T*abaqát, &c. and the disciple is the not less celebrated Çúfy A*h*mad b. 'áçim Avitázy. The first fifty pages contain questions of the pupil and answers of the Pyr on moral and metaphysical questions. The dialogue is managed with great skill and perspicuity. The rest of the book, about 400 pages, contains traditions of Mohammad as well as of other great persons of the first century of the Islám, and abounds in historical anecdotes, most of which are very valuable, for the history of civilization. The moral sentiments expressed in the work are sound and what struck me most is the democratic tendency of the author, which we find in no other work of the Musalmáns. This is the most ancient book on Sufism known, and in so far very valuable, for the history of this science; the copy is dated A. H. 486. Bound with it and written in the same hand and consequently also of A. H. 486 is a translation from the Greek of four small books ascribed to Enoch. I do not know whether they are identical with those lately translated from the Coptic. They contain exhortations to a pious life, invective against the rich

and the praise of poverty and abstemiousness, and they are therefore also of some interest for the history of Súfism. The date of the translation is not mentioned, but it must be old. It is in rhymed prose, and the language is very peculiar and hardly intelligible.

I am particularly rich in commentaries on the Qorân. Before I left Calcutta I obtained eight volumes (out of ten which compose the whole work) of the Tafsyr of *H*ákím (see *H*ájy Khalyfah *voce* Tahdzyb.) Here I found in the possession of Mr. Barnett, a Missionary, a book which I so often wished to have—an account on which occasion the works of the Qorân have been revealed. There is a work on the subject by Soyúty, for which I have made much search, but in vain. But the principal book is the اسباب نزول القرأن by Wá*h*idy (I believe he died in 468.) He gives in all instances the authenticated opinion of the contemporaries of the prophet, and a full account of the circumstances under which a verse was revealed. This will enable me to make the Qorân more fully bear on the biography of the prophet, than could otherwise have been done. Another work of equal or even greater importance is the درالمنثور في التفسير المآثور. The author's name is cut away, he says that he had written the ترجمان القران and that he made now a new edition of it in which he omitted the asnád with a view of reducing the extent of the work. This book consists, exclusively, of traditions bearing on the explanation of the Qorân. Even if the traditions are not all genuine, we have at all events the views which were taken in the first century of the Hijrah, on the meaning of the sacred code. I have unfortunately only about one-fourth of the work, and it fills near a thousand pages, small folio. The above two titles will enable me to find the name of the author and date in *H*ájy Khalyfah or in Soyúty's *T*ábaqat al mofassiryn. I have none of these two books at hand. How much more valuable such a work is—or in fact any tafsyr—than the disgusting dialectical discussions of Damakhshary, and his contemptible abbreviator Baydhawy or of Imám Rázy!

Good tafsyrs are very large and consist generally of more than twenty volumes. To find complete copies is out of the question. I therefore act on the conviction that the first centuries of the Islám—when complete works were to be had—will never return, and

take what I find, particularly if the MSS. are old. I have the eighth and last volume of the زاد المسير of Tan al Jawzy (d. 597), one out of about twenty volumes of Kortoby, and about twenty portions of other commentaries—some of the fourth century. I also have nearly a complete copy of the historical commentary of Sohayly (d. 581) which is short, but exceedingly valuable, the title is تعريف و اعلام لما أُبهِمَ فى القران من الاسما والاعلام

In speaking of Sufism I ought to have mentioned Ooshayry (d. 465) and his book being the groundwork for the history of this science. I have already two most beautiful copies at Calcutta, and here I found a third one; it is incomplete, but old.

The science on which all our enquiries into the early history of the Islám must be based, is the علم اصول الحديث The book in common use on it, is the Ibn *H*ajar's Nokhbah نخبة with commentary; I have two copies of it in India, but it appeared to me always very unsatisfactory. In our Society is an excellent copy of the Alfyyah with a very large commentary which is much more full. Here I found Nawowy's تقريب و تيسير which is very useful. He refers to a larger work of his called ارشاد of which this is an abridgment, but the Tishád 'Aurf he says is an abridgment of the work of Ibn Çaláh (born 577, died 643.) This is the work to get hold of. I have the منظومة الاشبيلي on the subject with two complete commentaries, one of which is dated 962, but the book is hardly more valuable than the unsatisfactory notices in the preface to 'Abd al-*H*aqq Dihlawy's Mishkát, or those in the introduction to the Dilly edition to Termidzy or those in the Sifr alsa'ádat. Of much more value is the شرف اصحاب الحديث by Abu Bakr A*h*mad b. 'alyy b. Thábit b. A*h*mad b. Mahdiy of the sixth century. He gives the opinions of the ancients on the subject, quoting his asnád in full. Unfortunately I have been able to obtain only a small portion of it. Among works, containing traditions, I met with one volume of Bayhaqy; he is so often quoted that I had very great expectations, but as it contained merely traditions bearing on prayers, I was much disappointed. More important—for me at least—is the Moçannaf المصنف of Abú Bakr 'abd Allah b. Mo*h*d b. Aby Shaybah 'absy. The eighth volume السفر الثامن (a very thick one) is in the Syrian Society, and contains upwards of 100 pages bearing on the Campaigns of Mohammad. I do not

know the date of the author, but he is older than the Bokhâry, and his accounts are of importance, because he gives for every fact his sanad like Wâqidy, whereas the asnâd for the *details* of the Campaigns are generally omitted by Ibn Isháq and even by Ibn Sa'd. Another work of some value on traditions is the فوايد المنتقاة of Abú-l-Qâsim 'abd Allah b. Mo*h*d b. 'abd al'azyz who lectured on the book in 315. I have unfortunately only the tenth part of it, but the copy was written in 407. In the commencement of the MS. (as is generally the case in ancient books on traditions) is the sanad of the copyist—Abú-l-Makârim Mo*h*d b. al-*H*osayn b. 'abd al'azyz Ibn Wahbân—up to the author, viz.

اخبرنا الشيخ الاجل ابوجعفر محمد بن احمد بن محمد بن الحسن بن المسلمة المعدل [ابقاه الله] قرأة عليه قال اخبرنا ابو طاهر محمد المخلص قرأة عليه فى جامع المنصور بعد الصلوة للثلثين من جمادى الاول سنة ثمان وثمانين و ثلثماية قال اخبرنا ابو القاسم عبد الله بن محمد بن عبد العزيز قرأة عليه سنة خمس عشرة و ثلثماية اخبرنا محمد بن عباد الخ

It appears that after the death of the copyist the book fell successively into the hand of other persons, and they severally wrote their asnâd in it up to the author and the date when he read it before their Shaykh. In so far the MS. itself is not without interest. I must not fatigue you with too long details on my hobby, particularly as I have an intention to write a separate article on the subject for the *Zeitschrift*.

On geography I have a copy of the حسن التقاسيم فى معرفة الاقاليم by Shams aldyn Abú 'abd Allah Mo*h*ammad b. A*h*mad Shámy *Maqdisy* *H*anafy, who composed the work in 375. You will probably find a notice of the author in Wûstenfeld's *Geographen* and in Reinaud's translation of Abú-l-Fidá, but perhaps not of the work, for if I am not mistaken, my copy is unique. Unfortunately the proprietor was aware of its value, and I had to give a tremendous price for it. The author assures us, that he has visited most Mohammadan countries, and spent upwards of ten thousand dirhams in travelling. Regarding places which he could not personally visit he did his best to obtain oral information. He also examined as many libraries as he could, and made extracts. With these claims

we may imagine that he speaks very lightly of his predecessors. Abú 'abd Allah Jobhány, he says was Wazyr of the Amyr of Khorásán, and a good astronomer; he gathered much information, among other things, regarding Indian mythology, but his book, he thinks, is too speculative and impractical. The principal object of Abú zayd Balkhy was to give maps and to this end he divided the globe into twenty parts, but the descriptions are, in his estimation, not full enough, as he had seen very little of the world. The same remark applies to Tan-al-Faqyh Hamadany, who enumerates only the large towns. The geographies of Ibn Khordádbah and Já*h*itz are much too short. In the whole it must be allowed that Maqdisy's work is by far the best arranged and approaches nearer to our notions of geography than any other: thus after the description of the division and cities of a country he gives, under separate heads, an account of the climate شؤون, commerce تجارات, productions which are peculiar to it, خصايص as for instance the Adym leather of Zabyd, weights, measures and coins مكاييل ونقود, of the dress and habits of the inhabitants رسوم, of the manner in which towns are supplied with water, and quality of the water المياه mineral productions معادن of the sights and places of pilgrimage مشاهد ومزارات, of the political divisions ولايات of customs and other towns duties and the custom-houses الضرائب والمراصد (this is the most interesting chapter of all) and finally of the distances. Having detailed the merits of the work I must not forget to mention the demerits of the copy. It is about two or three hundred years old and has all the maps. It consists of 236 pp. of 25 lines. But unfortunately the original seems to have been in a bad condition and the copyist had no second copy to supply the deficiencies. In one place nearly a page is left blank with the remark سقط عن الاصل In other places he would not decipher proper names and either he pointed them as he found them in the original or (and in some few instances) he omitted them altogether. Yet the MS. is in the whole correct and contains all the maps. A copy of so rare and valuable a work is under all circumstances a treasure, and even should another one be found, it would hardly sink in value, because it is not to be supposed that it by itself would be sufficiently complete and correct as to enable a man to edit it, and as a help this copy is extremely important.

You may make the following offer to the Society, I will write a very full analysis of the work, in fact a complete translation, to be printed with copious extracts from the Arabic original. I suppose it will fill three numbers of the Bibliotheca. Anticipating the sanction of the Society, I commenced my labour at once, because here I have greater facilities. Bound with it, is another work on Geography of a still earlier date—it was compiled under Motadhid billah (reigned from 279 to 289)—but of a very different character. The author was not a practical traveller, but a man of great learning. His book is full of quotations from the earliest and best authors: Kalby, Kinchy, Abú 'abaydah, Wáqidy, Ibn *H*abyb, &c., and contains many very valuable historical details. I do not know when Ibn. al-Faqyh Hamadany lived. If chronology is not against it, I put it down as his work. The book is not unique. There is an inferior copy of it in the India House, I believe, marked with either No. 616 or 628, and an old copy in the British Museum. This ought to be published in the Bibliotheca. My copy has been transcribed from a MS. which had been written in 413. I will make arrangements to have it copied out, and after having carefully compared it, I will send it to England in hopes to find some good soul who may join me in editing it and compare it with the two copies there. Kindly mention the subject to the Society and obtain their sanction to the publication.

I am now convinced that the Ashkál albilád is no other work than the original text of Abú Zayd Balkhy, and Istakhry is an abstract, and the صور البلاد sometimes quoted by Dowlatcháh and known in Europe as the "Ibn Hawqal of Sir W. Ouseley" is a free translation of it. We must, however, ascertain whether Istakhry or Abú Zayd is older. Be so good as to get the German translation of Istakhry and also Robinson's Biblical Researches for the Society's library; they may be useful for our purpose. Your wish, which you expressed in your last, that an ancient work on geography be forwarded is partly fulfilled.

In the library of the Syrian Society at Beyroot is a copy of Herawy's places of pilgrimage and sights, which is of some interest but not new, a copy of it being at Vienna. He visited and described these places in the seventh century. Much more curious is the

Journal of a Moorish traveller in France and Holland. His description of the sights of Paris is very amusing, but the most ludicrous part is his falling in love with a French heiress.

In speaking of Geography, I must not forget to mention two Europeo-Arabic works on the subject. One is a complete translation of Malte Brun, printed in Egypt, in folio. I have seen only the second volume. It seems to be well done. The other is a work, 8vo. about 350 pp. written in Arabic expressly for the use of the natives of this country by Dr. Van Dyek, an American Missionary, and printed at Beyroot. It is extremely well done. He consulted Arabic as well as European sources, and enlivens the subject occasionally with a verse. The language is a compromise between modern and classical Arabic and very idiomatic. A guarantee for the correctness of the style and language is that the poet Naçeff has written it over before it went to press. It would well deserve to be introduced in Mohammadan schools in India. Speaking of this translation I cannot help expressing my esteem for the American missionaries in Syria. Their object is not to found a new sect of Christians among the innumerable sects which already exist in those parts of the world, but to emancipate the Christians from superstitions and other tenets and practices which are either contrary or at all events not connected with religion. They are in fact apostles of civilization, and the consequence is that at Beyroot—their head quarters—and in the Libanon they have enlisted intelligence for themselves. They have not a body of governors, a Committee consisting of Sir John Dunky, the Hon'ble Ass, and similar highly respectable individuals, but they rule themselves, meeting for consultation whenever there may be need, public opinion being their only control. The Americans are too wide awake to use any other than the Arabic language as the vehicle of education, and some of them (particularly Dr. E Smith) are eminent Arabic scholars. They have printed several Arabic grammars, &c. and contributed much to induce the native Christians (to whom alone they address themselves) to cultivate their mother-tongue. The catholic clergy of the Libanon is obliged to follow their example, and they were establishing similar schools, and what is the most amusing part, they were teaching in them, the books printed by

the Americans. I have sent you on a former occasion specimens of their Arabic type. It is superior to any in Europe or India. You would hardly believe how much Europeanism is advancing at Beyroot, and gradually also in the interior of the country. As an instance, I may mention that there exists an Arabic theatre in that city, in which, of course, almost every night Haroon Arrasheed and Mamoon go over the stage. All that is required here is security of property, which, owing to the rapacity of the rulers, only the people of the mountains enjoy.

I come now to history—the ninth volume of the History of *T*abary forms part of the *Bibliotheca Sprengeriana* which rivals with the best public collections of Europe. It commences with the year 32 of the Hijrah, and comes down to the arbitration al Dúmat al-Jandal. This copy was written in 447 by 'aqyl b. Ahmad b. Mo*h*d. b. al-Azrag al-Farrá. The copy consisted of 16 volumes and was in 797 given as waqf to a Madrasah at Cairo, but even the third and tenth volumes were wanting. There is a complete copy of Ibn 'asákir's history of Damascus in this city. It consists of forty volumes in folio each of from 800 to 1,000 pages. The first half of the first volume contains the topography and the general history of Damascus, the remainder of the work is devoted to Biography; the arrangement is alphabetical, at the head however stands the life of the prophet. If we were to look out for the lives of Abú 'abaydah, Khálid, Mo'awiyah, &c., we could put together a most complete history of Syria. Valuable as the work is, it must be allowed that it is unnecessarily incumbered with asnád, which the author carries up from his time to the event on which he speaks. There would be no difficulty in obtaining permission to have it copied, and the expense would not exceed £200. But I fear the desire to secure so valuable a monument of the Islám for some European library will only rise when the work is lost. I have seen one volume of the history of the Turkish dynasties by Ibn *H*abyb' (d. 779) who commences with the year 648 and ends with 677. The book would be all the more valuable if it had not been in rhymed prose. I got here a copy of the first half of the Syrat Hishániyyah, which was written by Ibn al 'ajamy, and is the most carefully written MS. I have ever seen. It contains every vowel and when two

vowels are admissible (as in Ar*t*ah which is also pronounced Ir*t*ah) both are marked usually with a note in the margin, indicating which of the two readings is preferable, and it contains all the variantes (روايات) and in some instances invaluable historical notes. I have also a very excellent copy of the Syrat of 'alyy *H*alaby d. 1091. There exists a work of Mo*h*ibby, written in the style of Ibn Khallikán and containing the *viri illustres* of the eleventh century of the Hijrah. Here it is not very rare, yet expensive, but in Europe I know of only one copy. The work is written with much erudition and after Ibn Khake probably the most valuable biographical work in the Arabic language. Murady has continued it, giving the biography of the twelfth century. Of his work only one copy exists. Of the شقايق النعمان (literary biography of the Turkish empire) I have been told, copies were frequent but I have been able to secure only one, which is hardly sufficient, for in dates and names we have no means of arriving at correctness, except comparing several good copies. I have been favoured with the loan of Asrawy's biographies of learned Sháfiites (compiled 769 and copied 778) and I made an abstract of it which fills 33 sheets. Subsequently I obtained the loan of Ibn Qádhiy Shohbah's Shafiite Biography which come down to A. H. 840 and with those of Ibn Molaqqin and with the smaller work of Sabky on the same subject. Asrawy is by far the most erudite among the four works, but the arrangement is bad, and it contains many names which do not deserve to be preserved. Ibn Qádhiy Shohbah avoids the latter fault and is fuller in biography, but he wants research. The other two works are mere registers of names and dates. A copy of the first volume of الكمال فى اسماء الرجال is at Beyroot. I had it copied as it will enable us to correct our edition of the Içábah. I have also somewhat more than one-third of Mazzy's abstracts thereof. The other day Manay's biography of Çápés was offered to me for sale, but at an extravagant price, and it does not appear to me that it is better than Jámy's Nafa*h*át, excepting perhaps in regard to Bibliography.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For January, 1855.

At the Annual General Meeting of the Society held on the 3rd inst.

Sir James W. Colvile, Kt. President, in the Chair.

The Secretary read the following

REPORT.

The Council have the satisfaction of again congratulating the Society on its increasing prosperity both in respect of the accession of members and the improvement of its finances.

The number of elections in the past year has exceeded that of any previous year since 1849, and consists of one honorary and twenty-two ordinary members. The loss, during the same period, has been by death six, and by retirement eight, in all fourteen, leaving on the Society's roll 155 ordinary members, of whom only a few are permanently absent from India.

The obituary includes the names of the late accomplished scholar Sir H. M. Elliot, Prof. Jameson of Edinburgh, an old and distinguished honorary member, Dr. J. B. Mill, Dr. N. Wallich, Capt. T. Latter, and Capt. Boys.

The decease of the three members first named has already been specially announced at ordinary general meetings, which, in the case of Sir H. Elliot and Prof. Mill, have recorded resolutions, expressing their sense of the loss thereby inflicted on the cause of Oriental Literature. Capt. Latter was known as an excellent Burmese scholar and as the compiler of a grammar and other elementary works in that language. Capt. Boys had contributed, partly in our jour-

nal and partly in correspondence with men of science in London, to our general knowledge of Indian Entomology.

Finance.

The financial statements annexed to this report will be found to exhibit, after providing for all liabilities, a balance in favour of the Society amounting to Rs. 5,411-14-5. The total receipts for the past year has been Rs. 17,676-5-8, while the expenditure has been Rs. 16,233-9-9, leaving a surplus of Rs. 1,422-11-11, on the year's transactions.

The outstanding assets, though much reduced, still continue heavy, amounting to more than Rs. 9,000. The greater portion of them, however, may be considered as perfectly safe and realizable in course of the current year.

Of the probable income and expenditure for 1855, the following may be taken as a fair estimate.

Income.

Contributions from 132 Resident Members, ...	Rs.	8,448
Government Grants, ...		7,368
Journal, ...		1,100
Sale of Society's Publications, ...		1,500
Total, Rs.		18,416

Expenditure.

General Establishment, ...	Rs.	1,900
Museum ditto and contingencies, ...		7,920
Journal, 7 Nos		1,800
Library, ...		2,000
Miscellaneous, including Building, ...		1,150
Total, Rs.		14,770

The above estimate does not include the sale proceeds, until last year inconsiderable, of the Bibliotheca Indica. The income from this source, having lately much improved, the Council resolved, in August last, to make these proceeds over to the Oriental Fund

to which they strictly belong, in order to meet increasing demands on its resources. But for this measure, the above estimate would have shown an additional income to the amount of 6 or 700 Rs.

Library.

Much has been done in the way of enriching this department and of opening out and preserving the valuable books and MSS. already collected. The greater part of the books have now been placed in glazed cases. The prospect held out in the last report of the publication of a new Catalogue of the Library has not yet been realized, owing to the necessity of getting the whole of the MS. Catalogue re-arranged and re-copied. This work has, however, now been completed, and the Catalogue is nearly half printed. It will probably appear within the next six months.

The Council cannot omit here to notice a valuable accession of nearly 30 volumes received from the Imperial Academy of Sciences at Vienna, including the Transactions and other publications of the Academy.

Musuem.

Several contributions of Zoological and Mineralogical specimens have been received during the year. Among the latter should be mentioned, more especially, collections of value from Mr. Oldham, whose instructive lecture on the progress of his labours hitherto in the field of Indian Geology rendered our September Meeting one of great interest. The Society will be glad to learn that its collection of tertiary fossils from different parts of India is in course of being arranged by Dr. Falconer.

Officers.

The Council have again to express their satisfaction with the manner in which the Curators and the Librarian have discharged their respective duties.

Journals.

Six numbers of the Journal have been published during the year and a seventh is nearly ready for publication. An Index to the

whole series of the Journal and to volumes XIX. and XX. of the Asiatic Researches has also been prepared, and will be published in the course of the coming year. The facilities offered to the circulation of books and pamphlets in India by the new Postal Act will, the Council trust, materially promote the sale of this and their other publications.

Oriental Fund.

The Council have much pleasure in announcing that the impulse given to the publications of the Bibliotheca Indica by the arrangements adopted in 1853 has enabled them to issue 38 Nos. within the past year. Portions of fifteen different works have appeared, of which 5 Nos. have been edited by Dr. Röer, 6 Nos. by Lt. Lees, 1 by Dr. Sprenger, 19 by Mauluvi Mohammad Wajeeh, Mauluvi Bashíruddín, Mauluvi Sadídudín and Mauluvi Abdul Haq, and Múnshí Golam Qadir, 3 by Professor Hall, and 3 by Bábu Rájendralál Mittra.

The following are the names of the works published.

1. The Aphorisms of the Vedánta, by Bádaráyṇa with the commentary of Sankara A´chárya and the Gloss of Govindánanda—Edited by Dr. E. Röer, Fas. II. No. 89.

2. Uttara Naishada Charita, by Sri Harsa, with the commentary of Náráyana—Edited by Dr. E. Röer, Fas. VIII., IX. and X. Nos. 72, 87 and 90.

3. The Sanhitá of the Black Yajur Veda with the commentary of Mádhava A'chárya—Edited by Dr. E. Röer, Fas. I. No. 92.

4. The Fatooh ul Sham, being an account of the Mooslim conquests in Syria, by Aboo Ismael bin abd allah el azdi ul Baçri—Edited by Lt. Lees, Fas. III. and IV., Nos. 84 and 85.

5. The conquest of Syria commonly ascribed to Aboo abd allah Mohammed bin Omar ul Wakidi—Edited by Lt. Lees, Fas. III. @ VI., Nos. 96, 98, 102 and 103.

6. The Logic of the Arabians, in the Original Arabic, with an English Translation, by Dr. A. Sprenger, No. 76.

7. Soyuty's Itqan on the exegetic sciences of the Qorân—Edited by Mauluvis Sadídudín and Bashiruddin, Fas. IV. to X., Nos. 68, 70, 74, 77, 81, 99 and 104.

8. A Biographical Dictionary of Persons who knew Mahommed, by Ibn Hazár—Edited in Arabic by Mauluvis Mohammed Wajeeh, Abdul Haqq and Golám Qadir, Fas. II. to VII. Nos. 69, 75, 83, 86, 93 and 101.

9. A Dictionary of the Technical Terms used in the Sciences of the Musalmans—Edited by Mauluvis Mohammed Wajeeh, Abdul Haqq and Golám Qadir, Fas III. to VI. Nos. 82, 88, 95 and 100.

10. Tusy's list of Shyáh Books and Alam ul Hodas Notes on Shyáh Biography—Edited by Mauluvi Abdul Haqq, Fas. II. and III. Nos. 71 and 91.

11. The Sánkhya Pravachana Bháshya or Aphorisms of the Sankhya Philosophy, with a commentary—Edited by F. E. Hall, Esq. A. M. Fas. I. and II., Nos. 94 and 97.

12. The Surya Siddhanta with its commentary, the Guḍhártha Prakásáka—Edited by Fitz. Edward Hall, A. M. Fas I. No. 79.

13. The Lalita Vistara, or the Memoir of the Life and Doctrines of Sákya Siñha—Edited by Bábu Rájendralál Mittra, Fas. II. No. 73.

14. The Chhándogya Upanishad of the Sáma Veda, translated from the Original Sanskrita, by Bábu Rájendralál Mittra, Fas. I. No. 78.

15. The Chaitanya Chandrodaya or the Incarnation of Chaitanya —Edited by Bábu Rájendralál Mittra, Fas. III. No. 80.

One of the works published by Lieut. Lees, (Aboo Ismael's conquest of Syria) and another (Waquidy's Mogházi or Military Campaigns of the Prophet) which is now being edited by M. Von Kremer of the Austrian Consulate at Alexandria, form the texts of two writers of the first period of Arabic literature, hitherto inaccessible to Orientalists. For the opportunity of seeing the last work in our series, we are indebted to the exertions of our absent and enthusiastic member, Dr. Sprenger, at whose suggestion also our Philological Committee is in communication with Dr. Dozy of Leyden, regarding the publication of another writer of the same period, Belázori.

The President moved the following resolution of which notice was given at the December Meeting: "Canditates for admission as ordinary members may be proposed by any ordinary member who has received authority from the candidate to propose him, and the pro-

posal after being seconded by another ordinary member shall be laid before the next meeting of the Council; the names of the candidate and his proposer and seconder, shall be read at the two ordinary general meetings next ensuing such meeting of the Council, and during the interval between these two meetings shall be suspended in the society's meeting room, and the person proposed shall be balloted for at the last of such ordinary general meetings; and to constitute a valid election, not less than seven members must be present, and not less than two-thirds of those present must vote in favour of the candidate proposed."

Dr. Falconer proposed the following amendment, being the text of the draft bye-law, proposed by the Committee which was entrusted with the drawing up of the code of 1851. The amendment was seconded by Dr. Walker.

" Candidates for admission as ordinary members shall be proposed by a certificate in writing, signed by two or more ordinary members. The certificate shall specify the name, rank, profession, or trade of the candidate, that he is attached to science (or literature) and anxious to promote its progress, and that he is desirous of becoming a member. The certificate must be addressed to the Secretary, who shall lay it before the next meeting of the Council. It shall be read at the two ordinary general meetings next ensuing such meeting of the Council, and during the interval between these two meetings, it shall be suspended in the society's meeting room. The person therein proposed shall be balloted for at the ordinary general meeting at which the certificate is appointed to be read the second time, and immediately after such reading, and to constitute a valid election not less than eleven members must be present, and not less than two-thirds of those present must vote in favour of the candidate proposed."

Mr. Houstoun moved another amendment as follows: " that the Society revert to the original rule regarding the election of members which was in force before the adoption of the new code."

Captain Sherwill seconded this amendment.

The President then put Dr. Falconer's amendment which, as was also Mr. Houstoun's, was negatived. The original Resolution was then put and carried.

The meeting then proceeded to the election of Office-bearers for the ensuing year.

Mr. Mills and Capt. Sherwill having been appointed scrutineers, the following gentlemen were declared elected to serve for the ensuing year.

President.

Sir James W. Colvile, Kt.

Vice-Presidents.

Major General Hon'ble J. Low.
Lieut.-Col. W. E. Baker.
Bábu Rámgopál Ghose.

Council.

C. Allen, Esq.
Dr. G. G. Spilsbury.
Dr. A. C. Macrae.
Dr. T. Boycott.
Capt. H. L. Thuillier.
Lt. W. N. Lees.
Dr. E. Röer.
H. Woodrow, Esq.
H. Walker, Esq.
Bábu Bámaprásád Roy.
A. Grote, Esq.

STATEMENT
Abstract Statement of Receipts and

ZOOLOGICAL MUSEUM.							
Government grant for a Curator, ...	3,000	0	0				
Do. for Establishment and Contingencies, ..	600	0	0				
				3,600	0	0	
MUSEUM OF ECONOMIC GEOLOGY.							
Government grant for a Curator, ...	3,000	0	0				
Do. for Establishment and Contingencies, ..	768	0	0				
				3,768	0	0	
CONTRIBUTION, ...	7,082	0	0				
				7,082	0	0	
ADMISSION FEE, ...	480	0	0				
				480	0	0	
LIBRARY.							
Proceeds of Books sold, ...	1,292	0	0				
				1,292	0	0	
JOURNAL.							
Subscription and sale proceeds, ...	1,079	12	0				
				1,079	12	0	
SALE OF ORIENTAL PUBLICATIONS.							
Proceeds of Books sold, ...	306	0	0				
Freight, Contingencies, &c. refunded by the Oriental Publication Fund, ...	8	7	6				
				314	7	6	
DEPOSIT.							
W. Theobald Esq.	20	8	0				
				20	8	0	
SECRETARY'S OFFICE.							
Saving of Salary, ...	24	4	1				
General Establishment, Fine, ...	1	0	0				
				25	4	1	
Carried over,..				17,661	15	7	

No. 1.
Disbursements for 1854.

ZOOLOGICAL MUSEUM.								
Curator's Salary and House-rent, ...				3,480	0	0		
Establishment, ...				540	0	0		
Contingencies, ...				163	10	6		
Taxidermist, ...				108	0	0		
							4,291	10 6
MUSEUM OF ECONOMIC GEOLOGY.								
Curator's Salary, ...				3,000	0	0		
Establishment, ...				420	0	0		
Contingencies, ...				256	15	9		
							3,676	15 9
LIBRARY.								
Librarian's Salary, ...				840	0	0		
Establishment, ...				96	0	0		
Book-binding, ...				241	6	0		
Contingencies, ...				265	6	0		
Purchase of Books, &c.				150	0	0		
Book Cases, ...				64	8	0		
Stationery, ...				18	9	0		
Extra Writer, ...				37	3	0		
							1,713	0 0
JOURNAL.								
Copying Index, ...				36	0	0		
Printing, ...				1,806	14	0		
Drawing, colouring and Lithographing, ..				973	10	0		
Contingencies, ...				38	0	0		
Postage, ...				6	14	6		
Freight, ...				123	14	0		
							2,985	4 6
SALE OF ORIENTAL PUBLICATIONS.								
Freight, ...				5	7	0		
Contingencies, ...				0	0	6		
Cost of a Diagram, ...				3	0	0		
Paid to the Oriental Publication Fund, ..				306	0	0		
							314	7 6
DEPOSIT.								
Messrs. Houstoun, Walker, Sprenger and Hall,				77	7	9		
							77	7 9
SECRETARY'S OFFICE.								
General Establishment, ...				1,038	0	0		
Secretary's Establishment, ...				648	0	0		
Contingencies, ...				35	8	0		
Postage, ...				141	5	6		
Stationery, ...				42	12	0		
New Cabinets, ...				90	0	0		
							1,995	9 6
			Carried over,..				15,054	7 6

Brought forward, Co.'s Rs.				17,661	15 7
VESTED FUND.					
Interest of Company's Paper, ...	14	6	1		
				14	6 1
BALANCE.					
In the Bank of Bengal, at the close of 1853, ..	3,502	11	0		
Cash in hand, ...	359	15	5		
				3,862	10 5
Inefficient Balance, ...	376	8	1		
				376	8 1
Company's Rupees,..				21,915	8 2

1*st January*, 1855.

					Brought forward, Co.'s Rs.		15,054	7 6
VESTED FUND.								
Commission on sale and purchase, &c. &c. ..					9	11 9		
							9	11 9
MISCELLANEOUS.								
Contingencies for Meeting, &c.					265	11 0		
							265	11 0
DR. FAYRER,								
Postage, ...					1	2 0		
							1	2 0
BUILDING.								
Tax, ...					328	2 0		
Repairs, &c.					574	7 6		
							902	9 6
BALANCE.								
In the Bank of Bengal, ..		5,184	8 4					
Cash in hand, ...		28	13 10					
					5,213	6 2		
Inefficient Balance, ...		468	8 3					
					468	8 3		
							5,681	14 5
				Company's Rupees,..			21,915	8 2

E. E.

A. GROTE,
Secretary.

STATEMENT

Dr. *Cash Receipts and Disbursements of the Oriental Publication*

Custody of Oriental Works.								
Fine, ...			0	4	0			
						0	4	0
Asiatic Society.								
Interest of Company's Paper, ...			26	1	10			
						26	1	10
Issen Chunder Mazumdar,								
Loan, ...			1	2	5			
						1	2	5
Uttra Naishada,								
Refund, ...			315	13	0			
						315	13	0
Government Allowance, ...			6,000	0	0			
						6,000	0	0
Vested Fund.								
Interest of Company's paper, &c.			2,068	4	4			
						2,068	4	4
Biliotheca Indica,								
Sale of Oriental Publications, ...			482	10	0			
						482	10	0
Deposit Account, ...			11	0	0			
						11	0	0
Carried over,..						8,905	3	7

No. 2.

Fund for 1854. *Cr.*

CUSTODY OF ORIENTAL WORKS.				
Librarian's Salary, ...	360 0 0			
Establishment, ...	144 0 0			
Book binding, ...	117 4 0			
Glass Case, &c.	269 0 0			
Contingencies, ...	34 0 0			
Stationery, ...	8 13 0			
Postage, ...	11 5 0			
		944	6	0
ASIATIC SOCIETY.				
Loan of last year, ...	6 7 11			
Brokerage, Commission, &c. paid to Government Agent on its account, ...	14 6 1			
Cash, ...	11 11 9			
		32	9	9
DICTIONARY OF TECHNICAL TERMS.				
Printing, ...	1,916 9 0			
Copying, ...	139 5 6			
Editing Charges, ...	570 11 6			
Postage, ...	17 1 0			
		2,643	11	0
ISHA &C. UPANISHAD.				
Editing Charges, ...	92 4 0			
		92	4	0
BIOGRAPHICAL DICTIONARY.				
Copying Charges, ...	34 5 6			
Printing Charges, ...	1,054 0 0			
Editing Charges, ...	216 7 3			
		1,304	12	9
FATOOH UL SHA'M.				
Editing Charges, ...	88 0 0			
Printing Charges, ...	236 0 0			
		324	0	0
CONQUEST OF SYRIA.				
Printing Charges, ...	479 0 0			
		479	0	0
LALITA VISTARA.				
Editing Charges, ...	90 0 0			
Printing Charges, ...	14 0 0			
		104	0	0
CHHA'NDOGYA UPANISHAD.				
Translating Charges, ...	100 0 0			
Printing, ...	194 8 0			
		294	8	0
Carried over,..		6,219	3	6

Brought forward, Co.'s Rs. 8,905 3 7

Carried over,.. 8,905 3 7

	Brought forward, Co.'s Rs.	6,219	3 6
TUSY'S LIST.			
Printing Charges, ...	778 0 0		
Editing Charges, ...	36 0 0		
		814	0 0
ISSEN CHUNDER MAZUMDUR, ACCOUNTANT, ..	1 2 5		
		1	2 5
SARVADARSAN SANGRAHA.			
Printing Charges, ...	224 0 0		
		224	0 0
APHORISMS OF THE VEDA'NTA.			
Printing Charges, ...	224 0 0		
		224	0 0
UTTARA NAISHADA.			
Printing Charges, ...	448 0 0		
		448	0 0
BLACK YAJUR SANHITA'.			
Dr. Röer on account Editing Charges, ..	146 14 0		
		146	14 0
BLACK YAJUR BRA'HMANA.			
Bábu Rajendralal Mittra, on acct. Editing Charges, ...	50 0 0		
		50	0 0
GOVERNMENT SECURITY.			
Interest, ...	1,253 1 5		
Discount, ...	11 4 9		
Commission and Brokerage, ...	85 6 2		
		1,349	12 4
COPYING OF PURA'NS, ...	67 9 10		
		67	9 10
ITQAN.			
Printing Charges, ...	1,134 0 0		
		1,134	0 0
SA'NKHYA PRAVACHANA BHA'SHYA.			
Printing Charges, ...	782 3 0		
Freight, ...	7 0 0		
		789	3 0
WAQIDY.			
Postage, ...	39 8 0		
		39	8 0
SURYA SIDDHANTA.			
Printing Charges, ...	227 0 0		
		227	0 0
BIBLIOTHECA INDICA, ...	15 8 0		
		15	8 0
SA'HITYA DARPANA.			
Editing Charges, ...	283 0 0		
		283	0 0
CHAITANYA NA'TAK.			
Editing Charges, ...	181 0 0		
		181	0 0
	Carried over, ..	12,213	13 1

	Brought forward, Co.'s Rs.	8,905	3 7

BALANCE of 1853.

In Company's Paper with the Government Agent,	7,000 0 0		
Cash in his hands, ...	1,077 15 10		
		8,077	15 10
In the Bank of Bengal, ...	817 0 3		
		817	0 3
Company's Rupees,..		17,800	3 8

1*st January*, 1855.

RA'GHAVA PA'NDAVIYA.

						12,213	13 1
Cost of 5 copies of the above, ...			25	0	0		
						25	0 0

ARABIC LOGIC.

Editing Charges, ...			15	0	0		
						15	0 0

BALANCE.

In Company's Paper with the Government Agent,			3,500	0	0		
Cash in his hand, ...			10	4	0		
						3,510	4 0
In the Bank of Bengal,..			1,985	11	8		
Cash in hand, ...			45	6	11		
						2,031	2 7
Inefficient Balance, ...			5	0	0		
						5	0 0
		Company's Rupees,..				17,800	3 8

E. E.

A. GROTE,
Secretary.

STATEMENT No. 3.

Assets.

CASH.

Bank of Bengal, ...	Rs.	5,184	8	4		
Cash in hand, ...		28	13	10		
Inefficient Balance, ...		468	8	0		
Bank of Bengal on account of Journal,		108	12	5		
Government Agent, ...		500	0	0		
Williams and Norgate		838	8	0		
					7,129	2 7

OUTSTANDING.

Contribution, ...	Rs.	7,104	12	11		
Admission Fee, ...		320	0	0		
Subscription to the Journal,.....		959	4	0		
Sale of Journal,.....		70	12	0		
Library, ...		330	4	0		
Batavian Society of Arts,.....		83	1	9		
Dr. Fayrer,.....		1	2	0		
					8,869	4 8
Company's Rupees,....					15,998	7 3

Liabilities.

Hon'ble Sir J. W. Colvile, ...	Rs.	291	8	0		
J. W. Laidlay, Esq.		418	7	4		
R. Houstoun, Esq.....		176	0	0		
W. Theobald, Esq.....		10	8	0		
Journal Nos. IV. to VII., say, ...		800	0	0		
					1,696	7 4
Company's Rupees,....					1,696	7 4

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OF THE

ASIATIC SOCIETY OF BENGAL.

The * distinguishes Members absent and exempt from subscription.

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Allen, C. Esq. B. C. S., Calcutta.
Anderson, W. Lt.-Col., Bengal Artillery, Calcutta.
Avdall, J. Esq., Calcutta.
Banerjee, Rev. K. M. Professor Bishop's College, Howrah.
Barlow, Sir R. Bart. B. C. S., Calcutta.
Beaufort, F. L. Esq. B. C. S., Pubna.
Birch, R. J. H. Col., Calcutta.
Blagrave, T. C. Captain, 26th Regt. B. N. I., Trans-Sutledge Provinces.
Bogle, Lieut.-Col. Sir A., Arracan.
*Benson, R. Colonel, Europe.
Batten, J. H. Esq. B. C. S., Almorah.
Beckwith, J. Esq., Calcutta.
Blundell, E. A. Esq. C. S., Singapore.
Beadon, C. Esq. B. C. S., Calcutta.
Bruce, R. C. D. Captain, H. M. 29th Foot, Dinapore.
Byng, R. B. P. Hon. Capt. 62d Regt. B. N. I., Maulmein.
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Cust, R. N. Esq. B. C. S., Banda.

*Christison, A. Dr. B. M. S., Europe.
Campbell, A. Dr. B. M. S., Darjeling.
Cheap, G. C. Esq. B. C. S., Rajshaye.
Colvin, J. R. Hon'ble. B. C. S., Nynee Tal.
Colvin, B. J. Esq. B. C. S., Calcutta.
*Colvin, J. H. B. Esq. B. C. S., Europe.
Colvile, Hon'ble Sir J. W., Calcutta.
Colebrooke, E. Esq., Calcutta.
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Chapman, C. Esq., B. C. S., Calcutta.
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Dwarkanath Basu, Bábu, B. M. S., Gooroodaspur.
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Falconer, H. Dr. B. M. S. F. R. S., Botanical Garden, Seebpore.
Forbes, W. N. Col. B. E., Calcutta.
Fytche, A. Capt. 70th Regt. B. N. I., Arracan.
Freeling, G. H. Esq., B. C. S. Hammirpore.
Grant, D. Esq., B. C. S. Benares.
Gubbins, C. Esq. B. C. S., Muttra.
Govindchander Sen, Bábu, Calcutta.
Grote, A. Esq. B. C. S., Calcutta.
*Gladstone, M. Esq., Europe.
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Haughton, J. C. Capt., Maulmein.
Hodgson, B. H. Esq. B. C. S., Darjeeling.
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Hopkinson, H. Capt. 70th Regt. B. N. I., Arracan.
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Hall, F. E. Esq. M. A., Benares.
Hamilton, Sir R. N. C. Esq., Indore.
*Huffnagle, C. Esq., United States.
*Hearsey, J. B. Col. 10th Regt. Light Cavalry, Europe.
Heatly, S. G. T. Esq., Delhi.
Hayes, F. C. C. Capt., Lucknow.
Ishri Prasád Rajá, Benares.
Jerdon, T. C. Esq. M. M. S , Saugor.
*Jackson, W. B. Esq. B. C. S., Europe.
*Jackson, L. S. Esq. B. C. S., Mauritius.
Jenkins, F. Lieut -Col., Assam.
James, H. C. Lieut. 32nd Regt. B. N. I., Calcutta.
Jádava Krishṇa Siñha, Bábu, Calcutta.
*Johnstone, J. Esq., Europe.
Kay, Rev. W. Principal Bishop's College, Howrah.
Kabir-uddin Sháh Bahadur, Sassaram.
Kissory Chand Mittra, Bábu, Calcutta.
*Laidley, J. W. Esq., Europe.
Layard, F. P. Capt. 19th Regt. B. N. I., Malda.
Loch, G. T. Esq. B. C. S., Moorshedabad.
Low, J. Hon'ble Maj. Gen. C. B , Calcutta.
Lawrence, H. Col. Sir C. B., Ajmere.
Lees, W. N. Lieut. 42nd Regt. B. N. I., Calcutta.
Loftie, Lieut.-Col. M. L., Agra.
Lushington, F. A. Esq. B. C. S., Calcutta.
MacLeod, D. F. Esq., B. C. S., Jullunder.
*Maclagan, R. Lieut. B. E., Europe.
Money, D. C. Esq., B. C. S., Moorshedabad.
Morton, D. T. Esq. M. M. S., Maulmein.
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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1854.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.357	29.414	29.284	0.130	83.4	88.0	80.9	7.1
2	.381	.449	.335	.114	81.9	86.0	80.0	6.0
3	.471	.536	.427	.109	82.7	87.8	79.1	8.7
4	.521	.575	.475	.100	84.2	88.0	81.6	6.4
5	.565	.627	.516	.111	83.1	86.1	80.1	6.0
6	*Sunday.*							
7	.547	.612	.472	.140	85.6	90.6	81.7	8.9
8	.493	.546	.429	.117	84.9	86.8	83.6	3.2
9	.494	.551	.444	.107	82.5	84.2	80.6	3.6
10	.523	.574	.478	.096	81.1	82.9	79.2	3.7
11	.533	.601	.465	.136	82.1	86.6	79.6	7.0
12	.510	.553	.447	.106	82.4	86.2	79.5	6.7
13	*Sunday.*							
14	.555	.625	.502	.123	84.2	89.6	81.2	8.4
15	.644	.697	.599	.098	83.5	86.2	81.6	4.6
16	.673	.746	.616	.130	83.1	86.6	81.2	5.4
17	.688	.734	.638	.096	81.1	83.8	79.2	4.6
18	.687	.747	.632	.115	81.9	85.6	79.4	6.2
19	.668	.721	.611	.110	79.7	82.0	78.0	4.0
20	*Sunday.*							
21	.692	.755	.619	.136	84.6	89.8	81.0	8.8
22	.647	.692	.579	.113	84.2	86.6	82.5	4.1
23	.643	.692	.593	.099	83.7	86.8	81.6	5.2
24	.633	.693	.577	.116	83.4	87.6	80.0	7.6
25	.648	.710	.596	.114	84.2	88.5	80.2	8.3
26	.677	.734	.616	.118	83.2	87.2	79.0	8.2
27	*Sunday.*							
28	.595	.641	.515	.126	84.4	92.0	81.4	10.6
29	.587	.637	.539	.098	83.8	90.8	80.6	10.2
30	.601	.651	.537	.114	83.9	88.6	80.6	8.0
31	.577	.642	.506	.136	84.2	88.0	80.8	7.2

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1854.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	80.2	3.2	78 6	4.8	0.958	10.28	1.68	0.860
2	80.0	1.9	79.0	2.9	.970	.44	.00	.913
3	80.5	2.2	79.4	3.3	.983	.56	.16	.901
4	80.9	3.3	79.2	5.0	.976	.45	.79	.854
5	80.8	2.3	79.6	3.5	.989	.60	.26	.894
6	*Sunday.*							
7	82 6	3.0	81.1	4.5	1.037	11.06	.70	.867
8	82.7	2.2	81.6	3 3	.053	.27	.22	.902
9	81.3	1.2	80.7	1.8	.024	.00	0.64	.945
10	79.9	1.2	79.3	1.8	0.979	10.55	.62	.944
11	80.2	1.9	79.2	2.9	.976	.50	1.01	.912
12	80.7	1.7	79.8	2.6	.995	.69	0.92	.921
13	*Sunday.*							
14	81.8	2.4	80.6	3.6	1.021	.92	1.32	.892
15	81.4	2.1	80.3	3.2	.011	.84	.16	.903
16	81.1	2.0	80.1	3.0	.005	.77	.09	.908
17	80.1	1.0	79.6	1.5	0.989	.65	0.52	.953
18	80.4	1.5	79.6	2.3	.989	.65	.79	.931
19	78.5	1.2	77 9	1.8	.937	.12	.60	.944
20	*Sunday.*							
21	81.7	2.9	80.2	4.4	1.008	.79	1.60	.871
22	82.1	2.1	81.0	3 2	.034	11.07	.17	.904
23	81.5	2.2	80.4	3.3	.014	10.87	.20	.901
24	80.8	2.6	79.5	3.9	0.986	.57	.39	.884
25	81.8	2.8	80.0	4.2	1.001	.72	.52	.876
26	81.2	2.0	80.2	3.0	.008	.81	.08	.909
27	*Sunday.*							
28	81.9	2.5	80.6	3.8	.021	.92	.39	.887
29	81.5	2.3	80.3	3.5	.011	.82	.28	.894
30	81.7	2.2	80.6	3.3	.021	.94	.19	.902
31	81.7	2.5	80.4	3.8	.014	.85	.39	.886

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1854.

Hourly Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Midnight.	29.592	29.727	29.377	0.350	81.9	84.4	79.8	4.6
1	.575	.709	.364	.345	81.8	84.6	79.8	4.8
2	.561	.696	.347	.349	81.6	84.6	79 6	5.0
3	.552	.688	.346	.342	81.5	84.4	79.6	4.8
4	.550	.688	.349	.339	81.4	84.2	79.2	5.0
5	.563	.704	.350	.354	80.9	82.5	78.7	3.8
6	.573	.705	.361	.344	80.9	83.6	78.4	5.2
7	.593	.738	.387	.351	81.4	83.6	78.7	4.9
8	.610	.735	.383	.352	82.6	84.8	79.4	5.4
9	.624	.742	.387	.355	83.7	86.6	79.4	7.2
10	.629	.755	.378	.377	84.9	89.2	79.2	10.0
11	.620	.742	.373	.369	85.3	90.1	79.8	10.3
Noon.	.601	.714	.352	.362	86.2	91.0	80.6	10.4
1	.581	.691	.333	.358	86.4	92.0	80.6	11.4
2	.558	.691	.311	.380	86.0	91.2	79.6	11.6
3	.538	.682	.290	.392	85.4	88.4	79.2	9.2
4	.524	.645	.284	.361	85.1	89.2	79.2	10.0
5	.526	.645	.296	.349	84.4	87.8	79.6	8.2
6	.537	.652	.309	.343	83.7	86.6	79.5	7.1
7	.553	.663	.338	.325	83.0	85.8	79.0	6.8
8	.579	.686	.339	.347	82.7	85 0	79.0	6.0
9	.602	.716	.393	.323	82.3	85.3	78 5	6.8
10	.615	.731	.394	.337	82.1	85.2	78.0	7.2
11	.613	.726	.387	.339	81.9	84.6	78.4	6.2

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1854.

Hourly Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid-night.	80.5	1.4	79.8	2.1	0.995	10.71	0.73	0.936
1	80.4	1.4	79.7	2.1	.992	.68	.72	.937
2	80.4	1.2	79.8	1.8	.995	.71	.63	.944
3	80.3	1.2	79.7	1.8	.992	.68	.63	.944
4	80.1	1.3	79.4	2.0	.983	.58	.69	.939
5	79.7	1.2	79.1	1.8	.973	.49	.61	.945
6	79.8	1.1	79.2	1.7	.976	.52	.58	.948
7	80.2	1.2	79.6	1.8	.989	.65	.62	.945
8	80.7	1.9	79.7	2.9	.992	.66	1.02	.913
9	81.2	2.5	79.9	3.8	.998	.69	.38	.886
10	81.8	3.1	80 2	4.7	1.008	.77	.72	.862
11	81.9	3.4	80.2	5.1	.008	.77	.87	.852
Noon.	82.6	3.6	80.8	5.4	.027	.96	2.03	.844
1	82 4	4.0	80.4	6.0	.014	.81	.25	.828
2	82.4	3.6	80.6	5.4	.021	.90	.01	.844
3	82.0	3.4	80.3	5.1	.011	.80	1.88	.852
4	81.9	3.2	80.3	4.8	.011	.80	.77	.859
5	81.7	2.7	80.3	4.1	.011	.82	.49	.879
6	81.5	2.2	80.4	3.3	.014	.87	.20	.901
7	81.1	1.9	80.1	2.9	.005	.77	.05	.911
8	80.9	1.8	80.0	2.7	.001	.75	0.97	.917
9	80.7	1 6	79.9	2.4	0.998	.74	.84	.927
10	80.4	1 7	79.5	2.6	.986	.60	.91	.921
11	80.4	1.5	79.6	2.3	.989	.65	.79	.931

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1854.

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		
1	..	1.16	E. or N. E. or E. N. E. blowing sharp whole day.	Cloudy with occasional drizzling.
2	..	0.33	N. E. occasionally sharp or E.	Cloudy with constant drizzling.
3	..	0.71	E. or S. E.	Cloudy and constantly raining or drizzling.
4	115.0	0.16	S. E. or S.	Cloudy with rain between 8 and 9 P. M. and
5	..	0.34	S. E. or S.	Cloudy. [occasional drizzling.
6	*Sunday.*			
7	127.4	..	S.	Cloudy.
8	..	..	S. or S. W.	Ditto.
9	..	0 88	S. or S. E. or S. W.	Cloudy with constant rain.
10	..	0.86	S.	Ditto.
11	..	..	S. W. or W.	Cloudy with constant drizzling.
12	..	0.48	S. or S. W.	Ditto.
13	*Sunday.*			
14	124.0	..	W. or S. W. or S.	Cloudy with rain between 8 and 9 P. M.
15	..	1.04	S.	Cloudy with rain between 1 and 2 P. M. and
16	..	..	S. or S. E.	Cloudy. [occasionally drizzling.
17	..	1.66	S. E. or S. or S. W.	Cloudy and occasionally raining or drizzling.
18	..	..	Calm or S. W. or S.	Cloudy and drizzling at 4 P. M.
19	..	1.18	S. S. E. or S. S. W.	Cloudy with constant rain or drizzling.
20	*Sunday.*			
21	148.0	..	S. or S. W.	Cloudless till 6 A.M. cloudy afterwards with a shower of rain between 6 and 7 P. M. and a little drizzling afterwards.
22	..	0.60	S. blowing high at 8 and 10 P. M.	Cloudy. [between 1 and 2 P. M.
23	..	0.26	S. E. or S.	Cloudy with drizzling and a shower of rain
24	110.0	..	S.	Cloudy and raining at 4 P. M. and drizzling
25	130.0	..	S. or S. W. or S. E.	Cloudy. [now and then.
26	..	0.15	S. or S. W. (high at 10 P. M.)	Cloudy with a shower of rain between 2 and 3 A. M. and occasional drizzling.
27	*Sunday.*	0.66		
28	145.0		Calm or S.W. or S.E.	Cloudy and a shower of rain between 2 and 3 P. M. and a little drizzling afterwards.
29	130.0	0.12	S. or S. W.	Cloudy and raining or drizzling between 5 and 7 P. M.
30	135.0	0.82	Calm or N.E. or S.E.	Cloudless till 4 P. M. cloudy afterwards and raining at 4 P. M.
31	130.2	0.18	S.	Cloudless till 3 A. M. cloudy with a shower of rain between Noon and 1 P. M.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1854.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.587	29.634	29.518	0.116	84.2	89.4	81.0	8.4
2	.625	.688	.565	.123	83.6	88.2	80.4	7.8
3	*Sunday.*							
4	.665	.740	.589	.151	84.0	89.9	80.4	9.5
5	.633	.700	.572	.128	84.4	88.9	81.0	7.9
6	.611	.672	.480	.192	83.9	90.0	81.6	8.4
7	.588	.653	.505	.148	83.3	89.8	80.2	9.6
8	.550	.600	.486	.114	83.9	90.2	80.0	10.2
9	.558	.613	.507	.106	82.8	86.2	80.0	6.2
10	*Sunday.*							
11	.597	.645	.545	.100	82.8	87.9	80.7	7.2
12	.594	.649	.531	.118	80.5	83.8	79.2	4.6
13	.526	.588	.463	.125	80.3	83.6	77.4	6.2
14	.539	.597	.490	.107	83.5	86.6	80.2	6.4
15	.589	.655	.533	.122	83.2	86.0	81.2	4.8
16	.588	.642	.542	.100	83.8	88.4	79.8	8.6
17	*Sunday.*							
18	.659	.710	.592	.118	83 5	88.7	78.5	10.2
19	.660	.708	.581	.127	83.6	90.6	78.8	11.8
20	.666	.718	.594	.124	85.4	91.0	80.8	10 2
21	.696	.761	.636	.125	81.5	86.4	78.3	8.1
22	.730	.783	.677	.106	80.7	84.0	78.2	5.8
23	.699	.755	.622	.133	81.4	87.0	78.4	8.6
24	*Sunday.*							
25	.716	.759	.659	.100	78.0	79.7	76 0	3.7
26	.796	.853	.739	.114	79.9	84.6	76.8	7.8
27	.820	.882	.757	.125	82.0	86.6	77.8	8.8
28	.804	.877	.724	.153	82.3	86 9	78.0	8.9
29	.746	.812	.658	.154	84.2	89.8	79.6	10.2
30	.723	.777	.656	.121	83.0	88.2	80 9	7.3

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1854.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Date	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	81.7	2.5	80.4	3.8	1.014	10.85	1.39	0.886
2	81.4	2.2	80.3	3.3	.011	.84	.19	.901
3	*Sunday.*							
4	81.5	2.5	80.2	3.8	.008	.79	.38	.887
5	82.0	2.4	80.8	3.6	.027	.98	.33	.892
6	81.4	2.5	80.1	3.8	.005	.75	.38	.886
7	80.5	2.8	79.1	4.2	0.973	.45	.48	.876
8	80.3	3.6	78.5	5.4	.955	.25	.88	.845
9	80.3	2.5	79.0	3.8	.970	.42	.33	.887
10	*Sunday.*							
11	79.9	2.9	78.4	4.4	.952	.23	.52	.871
12	78.8	1.7	77.9	2.6	.937	.10	0.88	.920
13	79.1	1.2	78.5	1.8	.955	.31	.60	.945
14	81.6	1.9	80.6	2.9	1.021	.94	1.06	.912
15	81.6	1.6	80.8	2.4	.027	11.03	0.86	.928
16	81.0	2.8	79.6	4.2	0.989	10.60	1.50	.876
17	*Sunday.*							
18	80.2	3.3	78.5	5.0	.955	.25	.75	.854
19	80.4	3.2	78.8	4.8	.964	.34	.69	.860
20	81.7	3.7	79.8	5.6	.995	.62	2.06	.838
21	79.9	1.6	79.1	2.4	.973	.49	0.82	.927
22	78.4	2.3	77.2	3.5	.916	9.87	1.17	.894
23	77.8	3.6	76.0	5.4	.882	.50	.77	.843
24	*Sunday.*							
25	76.8	1 2	76.2	1.8	.887	.62	0.57	.944
26	77.7	2.2	76.6	3.3	.899	.71	1.07	.901
27	79.5	2.5	78.2	3.8	.946	10.17	.30	.887
28	79.7	2.6	78.4	3.9	.952	.23	.35	.883
29	81.2	3.0	79.7	4.5	.992	.61	.63	.867
30	81.1	1.9	80.1	2.9	1.005	.77	.05	.911

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta in the month of September, 1854.

Hourly Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the Month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Midnight.	29.673	29.829	29.561	0.268	80.9	84.0	77.4	6.6
1	.664	.825	.543	.282	80.8	83.6	77.8	5.8
2	.650	.818	.533	.285	80.5	83.2	77.7	5.5
3	.641	.812	.530	.282	80.3	83.0	77.5	5.5
4	.633	.808	.498	.310	80.1	83.0	77.0	6.0
5	.641	.813	.503	.310	79.8	82 8	76.0	6.8
6	.655	.823	.512	.311	79.8	82.6	76.5	6.1
7	.674	.853	.542	.311	80.2	82.6	76.9	5.7
8	.696	.870	.565	.305	81.7	84.8	76.4	8.4
9	.704	.877	.569	.308	83 0	85.8	77.8	8.0
10	.705	.882	.569	.313	84.0	87.2	77.5	9.7
11	.694	.862	.557	.305	85.4	89.2	78.6	10.6
Noon.	.670	.839	.531	.308	85.9	89.8	79.7	10.1
1	.647	.819	.486	.333	86.0	90.1	79.2	10.9
2	.623	.800	.470	.330	86.3	90.9	78.2	12.7
3	.604	.777	.472	.305	85.5	91.0	78.2	12.8
4	.591	.762	.463	.299	84.9	89.6	78.6	11.0
5	.597	.781	.472	.309	84.3	88.4	78.4	10.0
6	.611	.784	.481	.303	83.3	87.2	77.8	9.4
7	.625	.811	.479	.332	82.8	86.5	77.8	8.7
8	.648	.836	.503	.333	82.3	86.0	77.6	8.4
9	.672	.853	.516	.337	82.1	85.2	77.8	7.4
10	.681	.858	.540	.318	81.7	85.0	77.6	7.4
11	.679	.846	.550	.296	81.4	85.0	77.7	7.3

Abstract of the Results of the Hourly Metcorological Obscrvations taken at the Surveyor General's Office, Calcutta, in the month of September, 1854.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	Tgr.	Tgr.	
Mid-night.	79.6	1.3	78.9	2.0	0.967	10.43	0.67	0.940
1	79.5	1 3	78.8	2.0	.964	.40	.67	.939
2	79.3	1.2	78.7	1.8	.961	.37	.61	.944
3	79.1	1.2	78.5	1.8	.955	.31	.60	.945
4	79.1	1.0	78.6	1.5	.958	.34	.50	.954
5	78.8	1.0	78.3	1.5	.949	.24	.51	.953
6	78.8	1.0	78.3	1.5	.949	.24	.51	.953
7	79.0	1.2	78.4	1.8	.952	.27	.61	.944
8	79.9	1.8	79.0	2.7	.970	.44	.93	.918
9	80.3	2.7	78.9	4.1	.967	.39	1.43	.879
10	80.7	3.3	79.0	5.0	.970	.40	.77	.855
11	81.3	4.1	79.2	6.2	.976	.43	2.25	.823
Noon.	81.4	4.5	79.1	6.8	.973	.38	.49	.807
1	81.6	4.4	79 4	6.6	.983	.47	.44	.811
2	81.7	4.6	79.4	6.9	.983	.47	.55	.804
3	81.2	4.3	79.0	6.5	.970	.35	.37	.814
4	81.3	3 6	79.5	5.4	.986	.55	1.94	.845
5	81.1	3.2	79.5	4.8	.986	.55	.73	.859
6	80.6	2.7	79.2	4.1	.976	.48	.45	.878
7	80.2	2.6	78.9	3 9	.967	.39	.36	.884
8	80.2	2.1	79.1	3·2	.973	.47	.11	.904
9	80.1	2.0	79.1	3·0	.973	.47	.04	.910
10	80.0	1.7	79.1	2.6	.973	.47	0.90	.921
11	79.8	1.6	79.0	2·4	.970	.46	.81	.928

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1854.

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the sky.
	o	Inch.		
1	128.0	0.10	S. E. or E. or S.	More or less cloudy till 9 P. M. with a shower of rain at 1 P. M. cloudless after 9 P. M.
2	114.0	0.36	S. E. or S.	Cloudless till 6 A. M. more or less cloudy afterwards with a little rain at 2 P. M.
3	*Sunday.*			
4	130.0	..	S. E. or S.	More or less cloudy the whole day.
5	134.0	..	S. or S. E.	Scattered clouds.
6	146.0	0.59	S. E. or N. E.	More or less cloudy with a smart shower of rain at 4 P. M.
7	..	..	E.	More or less cloudy with little rain at 11 A. M.
8	126.0	0.20	S. E. or N. E. or S. S. E	Cloudy.
9	126.0	0.29	N. E. (high at 3 A. M.) or N. N. E. or E.	Cloudy with rain at 11 A. M.
10	*Sunday.*			
11	135.0	0.38	N. E. or E. constantly blowing sharp.	Cloudy and occasionally raining.
12	..	0.26	E. or S. E.	Ditto ditto ditto.
13	..	1.57	S. E.	Ditto ditto ditto.
14	..	..	S. or S. E. or S. S. E.	Cloudy.
15	..	..	S. E. or S.	Cloudy and drizzling at 10 P. M.
16	144.2	..	S. or S. W.	Scattered clouds and cloudless between 8 P. M. and midnight.
17	*Sunday.*	0.76		
18	125.0	..	W. S. W.	Cloudy or scattered clouds.
19	136.0	..	S. or S. W. or W. or N.	Ditto ditto.
20	140.0	..	S. or occasionally calm or N. E.	Cloudless till 5 A. M. Scattered clouds afterwards.
21	..	1.58	N. E. or N. W. or W. or calm.	Clear between midnight and 4 A. M. cloudy afterwards and occasionally raining or drizzling.
22	..	..	Calm or E. occasionally sharp.	Cloudy from midnight till 7 P. M. and clear afterwards, also drizzling at 1 P. M.
23	135.0	..	E. or N. E.	Cloudy the whole day and occasionally drizzling.
24	*Sunday.*	1.28	E. blowing high to whole day.	Cloudy the whole day and constantly raining or drizzling.
25	..			
26	..	0.88	E. always high or S. E.	Cloudy the whole day and raining at 8 A. M.
27	134.0	..	E.	More or less cloudy the whole day.
28	124 0	..	S.	Cloudless till 4 A. M. and scattered ⌒i or \i or _i afterwards.
29	141.0	..	S.	Cloudless till 3 A. M. Scattered ⌒i till 6 P. M. cloudless afterwards.
30	..	1.01	S.	Cloudless till 3 A. M. cloudy afterwards and also heavily raining between 2 and 4 P. M.

\i Cirri, _i Cirro-strati, ⌒i Cumuli, ⌒i Cumulo-strati, _i Nimbi, —i Stati, _i Cirro cumuli.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1854.

Latitude 22° 33′ 1″ North, Longitude 88° 20′ 34″ East.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	*Sunday.*							
2	29.751	29.807	29.703	0.104	82.4	86.0	80.6	5.4
3	.757	.817	.671	.146	82.8	89.8	79.2	10.6
4	.774	.840	.692	.148	83.2	90.0	79.4	10.6
5	.807	.885	.742	.143	83 9	90.6	79.4	11.2
6	.783	.851	.694	.157	85.1	90.0	80.4	9.6
7	.748	.825	.678	.147	83.5	89.6	80.2	9.4
8	*Sunday.*							
9	.831	.898	.757	.141	85.2	91.0	80.4	10.6
10	.857	.940	.805	.135	80.2	82.8	77.4	5.4
11	.780	.861	.684	.177	80.7	84.0	78.4	5.6
12	.766	.822	.721	.101	80.1	84.0	78.6	5.4
13	.840	.913	.784	.129	80.2	87.2	77.8	9.4
14	.898	.954	.855	.099	82.3	89.0	77.9	11.1
15	*Sunday.*							
16	.896	.964	.840	.124	80.2	87.6	74.0	13.6
17	.885	.961	.841	.120	79.1	86.4	73.3	13.1
18	.860	.938	.785	.153	77.5	84.6	71.9	12.7
19	.837	.915	.777	.138	77.6	85.0	70.8	14.2
20	.861	.909	.818	.091	79.2	85.4	74.1	11.3
21	.887	.945	.834	.111	80.8	87.0	73.5	13.5
22	*Sunday.*							
23	.877	.928	.840	.088	77.9	83.8	75.8	8.0
24	.903	.971	.856	.115	77.4	82.4	75.4	7.0
25	.896	.955	.838	.117	78.5	83.4	75 7	7.7
26	.861	.939	.799	.140	80.1	85.4	75.8	9.6
27	.880	.936	.828	.108	79.0	83.8	75.8	8.0
28	.946	.997	.895	.102	78.3	85.6	74.9	10.7
29	*Sunday.*							
30	.976	30.045	.921	.124	80.4	85.8	76.2	9.6
31	.975	.052	.919	.133	80.3	86.2	74.8	11.4

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1854.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon. *(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	*Sunday.*							
2	80.4	2.0	79.4	3.0	0.983	10.56	1.05	0.910
3	80.2	2 6	78.9	3.9	.967	.39	.36	.884
4	80.3	2.9	78 8	4.4	.964	.36	.53	.871
5	80.5	3.4	78.8	5.1	.964	.34	.79	.852
6	81.6	3.5	79 8	5.3	.995	.64	.93	.846
7	80.8	2.7	79.4	4.1	.983	.54	.46	.878
8	*Sunday.*							
9	81.6	3.6	79.8	5.4	.995	.64	.97	.844
10	78.9	1.3	78.2	2.0	.946	.21	0 67	.938
11	79.1	1.6	78 3	2.4	949	.24	.80	.928
12	78 8	1.3	78.1	2.0	.943	.18	.66	.939
13	78.2	2.0	77.2	3.0	.916	9.89	.99	909
14	78.9	3.4	77.2	5.1	.916	.85	1.73	.851
15	*Sunday.*							
16	74.6	5.6	71 8	8.4	.771	8.31	2.57	.764
17	73.2	5.9	70.2	8 9	.732	7 91	.62	.751
18	71.8	5.7	68.9	8.6	.701	.60	.44	.757
19	73.1	4.5	70 8	6 8	.746	8.09	1.98	.803
20	75.3	3.9	73.3	5.9	.809	.73	.83	.827
21	76.6	4.2	74.5	6.3	.840	9.07	2.00	.819
22	*Sunday.*							
23	76.1	1.8	75.2	2 7	.860	.31	0.85	.916
24	75.7	1.7	74.8	2.6	.849	.20	.81	.919
25	76.6	1.9	75.6	2.9	.871	.42	.93	.910
26	77.8	2.3	76.6	3.5	.899	.69	1.15	.894
27	77.0	2.0	76.0	3.0	.882	.54	0.96	.909
28	76.0	2.3	74.8	3.5	.849	.19	1.09	.894
29	*Sunday.*							
30	75.6	4.8	73.2	7.2	.806	8.70	2.24	.795
31	76.2	4.1	74.1	6.2	.830	.96	1.95	.821

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1854.

Hourly Means, &c of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Midnight.	29 853	29.983	29.742	0.241	78.3	83.2	73.3	9.9
1	.844	.968	.733	.235	78 0	82.7	72.8	9.9
2	.834	.959	.721	.238	77.8	82.6	72.3	10.3
3	.827	.960	.718	.242	77.7	82.4	72·0	10.4
4	.829	.962	.715	.247	77 3	82.5	71·5	11.0
5	.838	.973	.722	.251	77.3	82.6	71.3	11.3
6	.856	30.005	.744	.261	77.0	81.8	70.8	11.0
7	.887	.025	.760	.265	77·6	82 2	72·5	9.7
8	.901	.049	.793	.256	80.0	84.7	76·0	8.7
9	.913	.052	.807	.245	81.6	86.3	78·2	8 1
10	.913	.047	.800	.247	82 9	87.4	76·8	10.6
11	.894	.026	.786	.240	84.2	88.9	79·9	9.0
Noon.	.869	29.992	.757	.235	85.3	90.4	82.4	8.0
1	.839	.955	.738	.217	85.2	91.0	77 8	13.2
2	.815	.934	.706	.228	85.5	90.6	78.8	11.8
3	.800	.921	.678	.243	85.0	91.0	77.1	13.9
4	.798	.925	.671	.254	84.0	90.0	77.2	12.8
5	.803	.931	.692	.239	82.4	89.4	76.8	12·6
6	.815	.952	.692	.260	80·9	87.2	76.3	10 9
7	.836	.969	.706	.263	80·1	86.3	76.2	10.1
8	.858	.997	.727	.270	79·6	85.6	76 2	9.4
9	.871	30.001	.747	.254	79·2	85.1	75.0	10.1
10	.875	29.996	.759	.237	78·9	84.6	74.7	9.9
11	.870	.988	.752	.236	78.6	84.0	74.7	9.3

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the Month of October, 1854.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of Air.	Additional weight of vapour required for complete saturation.	Mean degree of Humidity complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Midnight.	76.8	1.5	76.0	2.3	0.882	9.56	0.72	0.930
1	76.6	1.4	75.9	2.1	.879	.53	.66	.935
2	76.4	1.4	75 7	2.1	.873	.47	.66	.935
3	76.5	1.2	75.9	1.8	.879	.53	.57	.944
4	76.1	1.2	75.5	1.8	.868	.42	.56	.944
5	76.2	1.1	75.6	1.7	.871	.44	.54	.946
6	75.8	1.2	75.2	1.8	.860	.33	.56	.943
7	76.3	1.3	75.6	2.0	.871	.44	.63	.937
8	77.3	2.7	75.9	4 1	.879	.49	1.32	.878
9	77.9	3.7	76.0	5.6	.882	.48	.86	.836
10	78.1	4.8	75 7	7.2	.873	.38	2.41	.796
11	78.5	5.7	75.6	8.6	.871	.31	.93	.761
Noon.	79.1	6.2	76 0	9.3	.882	·43	3.21	.746
1	78.8	6.4	75.6	9.6	.871	.29	.32	.737
2	79.3	6.2	76.2	9.3	.887	.49	.23	.746
3	79.0	6.0	76.0	9.0	.882	.43	.10	.753
4	78.6	5.4	75.9	8.1	.879	·42	2.75	.774
5	77.9	4.5	75.6	6.8	.871	·35	.26	.805
6	77.7	3.2	76.1	4.8	.885	·53	1.57	.859
7	77.6	2.5	76.3	3 8	.890	·61	.23	.887
8	77.4	2.2	76.3	3.3	.890	.63	.06	.901
9	77.4	1.8	76.5	2.7	.896	.69	0.87	.918
10	77.2	1.7	76.3	2.6	.890	.63	.84	.920
11	77.0	1.6	76.2	2.4	.887	.62	.76	.927

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1854.

Solar radiation, weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	*Sunday.*			
2	..	..	S. or S. W. or W.	Cloudless till 8 A. M. cloudy afterwards and drizzling at 4 P. M.
3	141.0	..	Calm or N. E. or S. E. or S. W.	Cloudless till 4 A. M. cloudy afterwards and drizzling from 5 P. M. to 11 P. M.
4	142 0	0.11	S. W. or E. or W.	Cloudy till 9 P. M. cloudless afterwards.
5	146.0	..	S. or N. E. or S.	Cloudless till 1 P. M. cloudy till 7 A. M. cloudless afterwards.
6	148.0	..	S. or E. or W. S. W. or Calm.	Cloudless till 7 A. M. cloudy afterwards, cloudless at midnight.
7	142.0	0.82	S. W. or W. S. W. or S. E.	Cloudless till 8 A. M. cloudy afterwards, also drizzling between 7 and 8 P. M.
8	*Sunday.*			
9	146.0	..	S. or N. or S.	Cloudless till 8 A. M. scattered ⌒i afterwards, also a shower of rain between 5 and 6 P. M.
10	..	0 96	E. or S. E. or N. E.	Cloudy the whole day with constant rain.
11	..	0.16	N. E. or S. E.	Cloudy the whole day, also drizzling at 11 A. M.
12	..	0.26	S. or S. S. W. or S.	Cloudy the whole day with occasional drizzling.
13	120.0	..	S. or W.	Cloudy the whole day, also drizzling at 4 P. M.
14	138.0	0.26	S. E. or S. or E.	Clouds of various kind the whole day.
15	Sunday.			
16	143.0	..	N. W. or W. or W. N. W.	Cloudless till 8 A. M. scattered \i till 6 P. M. cloudless afterwards.
17	144.0	..	N. W. or W.	Cloudless.
18	142.0	..	W. or N. W.	Cloudless.
19	140.0	..	W.	Cloudless.
20	145.0	..	W. or S. W.	Cloudless nearly the whole day.
21	144.5	..	S. or W. or N. E.	Cloudless till 11 A. M. scattered ⌒i or \—i afterwards.
22	*Sunday.*			
23	125.5	0.84	N. E. or E. or S. E.	Cloudless till 5 A. M. cloudy afterwards, also a shower of rain between 2 and 3 P. M.
24	..	0.22	E. or S. E. or S.	Cloudy the whole day, also drizzling at 1 P. M.
25	115.0	..	E. or S. E. or S.	Cloudy.
26	129.0	..	S.	Cloudy, also drizzling at 8 P. M.
27	120.0	..	S. or N.	Cloudless till 3 A. M. cloudy till 7 P. M. cloudless afterwards.
28	134.0	0.38	S. or N. E.	Nearly cloudy the whole day, also raining between 6 and 8 P. M.
29	*Sunday.*			
30	145.5	..	S. or N. E.	Cloudy.
31	143.0	..	N. or S. E.	Clouds of various kinds till 6 P. M. cloudless afterwards.

\i Cirri, \—i Cirro-strati, ⌒i Cumuli, ⌒—i Cumulo-strati, \—i Nimbi, —i Strati, \⌒i Cirro-cumuli.